

**CLASS 526, SYNTHETIC RESINS OR NATURAL RUBBERS -- PART OF THE CLASS 520 SERIES****SECTION I - CLASS DEFINITION**

Class 526 provides for all processes of preparing polymers from only ethylenically unsaturated monomers and for all products thereof when such products and processes are not provided in higher subclasses in the Class 260 schedule hierarchy.

In addition, Class 526 provides for certain polymerization processes which are applicable to any type of reactant or monomer.

**SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS**

A. The following rules apply to claim classification in the area encompassing subclasses 72 through 352.2 of this class.

(1) For purposes of clarification in this schedule, subclasses 59-238 will be deemed to be process subclasses, and subclasses 239-352.2 will be indicated as being product subclasses.

(2) Patents that claim a product and process, wherein both the product and the process are specifically provided for in the schedule, are classified in the process area (59-238) and cross-referenced to the product area (239-352.2).

(3) Patents that claim a provided for process (59-238) and a nonprovided for process (other than 89) but where the monomers being polymerized are provided (239-352.2) are classified in the process area (59-238) and cross-referenced into the product area on the basis of the first appearing monomer in the schedule that is being polymerized (239-352.2).

(4) Patents that claim both a provided for (239-352.2) product and a process of polymerizing (59-238) and wherein the product is claimed in process terms are classified on the basis of the process (59-238) and cross-referenced to the first appearing monomer in the schedule utilized in preparing the polymer.

(5) Patents that claim a product solely in process terms are classified on the basis of the process (59-238) when said process is provided in the schedule and cross-refer-

enced to the first appearing monomer in the schedule utilized in preparing the polymer.

(6) Patents that claim a product in process terms and wherein the process is not provided in subclasses (59-238) are classified on the basis of the first appearing monomer in the schedule utilized in preparing the polymer.

(7) Patents that claim a polymerizable composition or the preparation of a polymerizable composition are classified on the basis of the first appearing monomer (239-352.2) in the schedule that is part of the polymerizable composition.

(8) Patents that claim a polymer only are classified on the basis of the first appearing monomer in the schedule (239-352.2) that has been polymerized in preparing the polymer.

(9) Patents that claim merely vulcanizing, curing, or cross-linking of a polymer proper for this area, without the presence of a specified vulcanizing, curing, or cross-linking agent, or the amount of the chemical agent or the vulcanized, cured or cross-linked product of such a reaction are classified on the basis of the first appearing monomer in the schedule (239-352.2) that has been polymerized in preparing the polymer.

(10) Patents that claim a polymer which is the result of a degradation of a polymer proper for this area (239-352.2) and wherein the degradation has been effected in the absence of any chemical agent are classified on the basis of the initial first appearing monomer in the schedule (239-352.2) that has been polymerized in preparing the previously-formed polymer that is degraded.

(11) Each product subclass, subclasses 239-352.2 unless specifically limited in its title, includes homopolymers and interpolymers.

(12) "Interpolymerized" as used throughout the product area subclasses 239-352.2 includes all combinations of the necessary monomers as required in the definition of the particular subclass in combination with any other monomer not provided for in a higher subclass of the schedule.

(13) A monomer for purposes of this subclass is a material which occurs in a polymer as a repeating unit and is present in at least three units and as used herein "monomer" is meant to exclude catalyst residues, chain transfer agents, etc; however, a nonethylenic carbohydrate or nonethylenic protein which is present during polymer-

ization of an ethylenic monomer and which is described as chemically bonded to the polymer is proper subject matter for Class 527, subclasses 313+.

(14) This subclass provides for processes wherein an ethylenically unsaturated monomer is undergoing polymerization and concurrently therewith is reacting with a second ethylenic material, which second ethylenic material does not enter into the polymer backbone, e.g., polymerizing acrylic acid in the presence of allyl alcohol so that the final polymer is a polymerized acrylic acid having ester groups which are derived from the unsaturated alcohol.

(15) The sole requirement for the products of this subclass is that the polymerization reaction involve only ethylenic unsaturated monomers. Note, however, that the actual polymerization mechanism need not involve the ethylenically unsaturated group (e.g., polymerization of a glycidyl methacrylate may involve the double bond in one instance and in another instance may involve the ring opening of the epoxy group, etc.).

(16) The treatment of a liquid polymer derived from an unsaturated monomer which is to be further polymerized is regarded as involving polymerization rather than as an after-treatment of a polymeric polymer and is therefore classified in this area as against the chemical after-treatment area, Class 525, subclasses 326.1+.

(17) In subclasses 239-352.2 each indent of a specific form of "from monomer" only refers to species of that type monomer and not to other monomers that may be interpolymerized therewith. When other monomers which are not species of the "from monomers" are to be taken into account the subclass has been identified as "interpolymerized."

B. The following are lines relating to special subclasses:

(1) Subclasses 218.1+, 219.3+, 219.6

- (1) Note. A patent which recites a polymerization process which utilizes (a) a material proper for subclasses 218.1+ in combination with either a specified or nonspecified amount of "hydrocarbon or halo hydrocarbon" will not be classified in subclass 219.3 or its indents, but will be found in 219.6 or 218.1+; proper, however, for subclass 219.3 or its indents is the situation wherein when either the hydrocarbon or halo hydrocarbon is defined in some degree (e.g., dihaloge-

nated, dibrominated, contains specified chain length, boiling or freezing point range, etc.); (b) a "free radical" catalyst with either a specified or nonspecified amount of "hydrocarbon or halo hydrocarbon" will be classified with the polymer providing this was the only remaining basis for classification.

## SUBCLASSES

### 59 EFFECTING A CHANGE IN A POLYMERIZATION PROCESS IN RESPONSE TO A MEASUREMENT OR TEST:

This subclass is indented under Class 520, subclass 1. Subject matter wherein a process parameter is determined and some polymerization process parameter is altered in response to the determination.

- (1) Note. A test or measurement performed by a human being with a subsequent control operation is proper herein.
- (2) Note. Treating a material to a certain condition without a defined inanimate measurement, test, inspection, or control (e.g., temperature, pH, etc.) is not proper subject matter for this subclass and classification of such a process will be accorded on some other basis.

### 60 Change responsive to composition property other than density:

This subclass is indented under subclass 59. Subject matter wherein a polymerization process parameter is altered in response to the composition or composition property and wherein the composition property is other than density, per se.

- (1) Note. Included within the definition of composition or composition property is the determination of the identity of a component or the relative amount of a component in a stream, electrical conductivity, redox, potential, pH measurement, molecular weight, melt index, optical properties, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

59, for a process involving measurement of density, per se, followed by a control operation in response to the measurement.

**61 Change responsive to pressure or temperature:**

This subclass is indented under subclass 59. Processes wherein a polymerization process parameter is altered in response to a determination of temperature or pressure.

**62 POLYMERIZING IN REACTOR OF SPECIFIED MATERIAL, OR IN REACTOR IN WHICH SURFACE CONTACTING POLYMERIZING MATERIAL HAS BEEN TREATED:**

This subclass is indented under Class 520, subclass 1. Subject matter wherein the polymerization reaction takes place in (1) a reactor of specified material; or (2) a reactor part is of a specified material; or (3) wherein the reactor or part of the reactor has been treated in some manner.

(1) Note. Specified material includes a recitation that the reactor material be free from certain specified material.

(2) Note. Included herein but not limited to the enumerated examples are stainless steel and glass-lined reactors, reactor parts such as titanium stirrers, and reactors that have been subjected to a specified wash or the application of a coating material.

**63 POLYMERIZING IN PRESENCE OF INERT SOLID MASSES SO AS TO HEAT, COOL, OR GRIND POLYMERIZING MASS:**

This subclass is indented under Class 520, subclass 1. Subject matter wherein heat exchange or reduction of particle size of a polymerizing polymer is effected by direct contact of said polymerizing polymer with an inert-solid mass which solid is not an internal part of the polymerization apparatus or of the processing apparatus.

(1) Note. "Inert-solid mass" includes steel shot and ceramic rollers.

(2) Note. This subclass does not include indirect cooling or heating (e.g., cooling outside of reactor so as to cool reactor contents, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:

88, for mixing, agitating, etc. of a polymerizing polymer utilizing a stirrer or some other means which means or stirrer is part of the apparatus or processing equipment.

**64 POLYMERIZING IN TUBULAR OR LOOP REACTOR:**

This subclass is indented under Class 520, subclass 1. Subject matter wherein polymerization is effected in a loop or tubular reactor.

(1) Note. A loop reactor for purposes of this subclass is an apparatus wherein polymerization material is circulated in a continuous path within a single or multi-coiled or spiraled structure which has at least one inlet and outlet means and at least one reaction zone.

(2) Note. A tubular reactor for purposes of this subclass is an apparatus wherein polymerizable material flows in an essentially linear direction in a tube or series of interconnected tubes, which tube or tubes are of small diameter in relation to their length and wherein each tube has at least one inlet and outlet means and one or more polymerization reaction zones.

**65 POLYMERIZING IN TWO OR MORE PHYSICALLY DISTINCT ZONES:**

This subclass is indented under Class 520, subclass 1. Subject matter wherein polymerization is effected in at least two or more physically distinct zones, (e.g., regions, stages, etc.) said zones being part of a single reactor which has a plurality of such physically distinct zones or such zones may be part of separate polymerization reactors which are interconnected at some point.

- (1) Note. For the most part patents herein relate to advancement of polymerizing materials from one zone to another so as to effect a progressive degree of polymerization and which are usually advanced until the degree of polymerization is brought to the desired state.

**66 Adding material to polymerization zone in an incremental or sequential manner:**

This subclass is indented under subclass 65. Subject matter wherein material (e.g., monomer, catalyst, etc.) is added to a zone containing polymerizable material therein, said polymerizable material being in a state undergoing active polymerization and wherein said material is added in a sequential or incremental manner.

- (1) Note. "Sequential or incremental" addition requires (1) the addition of material involving a halting, interruption, or pausing in the addition of the same material followed by a resumption of addition; or (2) the addition of materials to a polymerization zone followed by the addition of materials distinct from the previous material, or (3) the addition of disproportionate amounts of materials so that the addition of one is completed prior to the completion of the addition of the other material.

**67 REMOVING AND RECYCLING REMOVED MATERIAL FROM AN ONGOING POLYMERIZATION ZONE TO A POLYMERIZATION ZONE:**

This subclass is indented under Class 520, subclass 1. Subject matter wherein a portion of material is removed from a zone wherein material is undergoing polymerization and the removed material either with something added to it, removed from it, or the removed material, per se, is added to a zone wherein an active polymerization is occurring.

**68 Recycling monomer:**

This subclass is indented under subclass 67. Subject matter wherein monomer is removed from and recycled back to an ongoing polymerization reaction zone.

- (1) Note. The removal herein need only involve a monomer. For instance, removing material containing monomer admixed with diluent and the recycling of both would be proper herein.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 69, for processes involving removing catalyst or catalyst component together with monomer and recycling of only the catalyst.  
70, for processes involving removing monomer and diluent and recycling only the diluent.

**69 Recycling catalyst:**

This subclass is indented under subclass 67. Subject matter wherein a catalyst or catalyst constituent is removed from and recycled back to an ongoing polymerization zone.

- (1) Note. The removal herein need not solely involve a catalyst or catalyst constituent. For instance, removing a catalyst admixed with a diluent and the recycling of both would be proper herein.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 70, for processes involving removing a catalyst or catalyst component and a diluent and the recycling of only the diluent.

**70 Recycling diluent:**

This subclass is indented under subclass 67. Subject matter wherein a diluent or diluent component is removed from and recycled back to an ongoing polymerization zone.

**71 REMOVING ONLY NONPOLYMERIZED OR NONPOLYMERIZABLE MATERIAL DURING POLYMERIZATION PROCESS:**

This subclass is indented under Class 520, subclass 1. Subject matter wherein only nonpolymerizable material is removed during the polymerization reaction.

- (1) Note. Excluded from this subclass is the removal of polymerized materials

admixed with nonpolymerized or nonpolymerizable material.

**72 POLYMERS FROM ONLY ETHYLENIC MONOMERS OR PROCESSES OF POLYMERIZING, POLYMERIZABLE COMPOSITIONS CONTAINING ONLY ETHYLENIC MONOMERS AS REACTANTS OR PROCESSES OF PREPARING:**

This subclass is indented under Class 520, subclass 1. Subject matter involving polymers derived from ethylenically unsaturated monomers only and processes of polymerizing same; polymerizing compositions containing ethylenically unsaturated monomers only and processes of preparing polymerizable compositions.

- (1) Note. This subclass provides for processes wherein an ethylenically unsaturated monomer is undergoing polymerization and concurrently therewith is reacting with a second ethylenic material, which second ethylenic material does not enter into the polymer backbone, e.g., polymerizing acrylic acid in the presence of allyl alcohol so that the final polymer is a polymerized acrylic acid having ester groups which are derived from the unsaturated alcohol.
- (2) Note. The sole requirement for the products of this subclass is that the polymerization reaction involve only ethylenic unsaturated monomers. Note, however, that the actual polymerization mechanism need not involve the ethylenically unsaturated group (e.g., polymerization of a glycidyl methylacrylate may involve the double bond in one instance and in another instance may involve the ring opening of the epoxy group, etc.).
- (3) Note. This subclass and its indents provide for processes for adding material to an ongoing polymerization process or where preformed liquid polymers are further polymerized so as to form a final polymerized product.

**SEE OR SEARCH CLASS:**

- 525, Synthetic Resins or Natural Rubbers, subclasses 242+, for products resulting from or involving a polymer derived from only ethylenic monomers reacted with an ethylenically unsaturated reactant, or for products resulting from or involving a polymer derived from at least only ethylenic monomers reacted in the presence of an ethylenically unsaturated monomer. Subclasses 242+ also provides for the processes of preparing products properly classifiable within the subclass.
- 528, Synthetic Resins or Natural Rubbers, subclasses 480+ for processes of treating a polymer not involving a chemical modification of the polymer, by the addition of a material thereto and for chemically modifying materials other than the ethylenic polymer. Subclasses 480+ also provide for the processes of admixing with a broadly claimed nonreactant material.

**73 Polymerization involving two or more specified temperature or pressure conditions:**

This subclass is indented under subclass 72. Subject matter wherein the polymerization reaction is effected using at least two different pressures or at least two different temperatures.

- (1) Note. The temperature or pressure must be increased or decreased under controlled conditions so that the temperature or pressure is maintained for a definite period of time prior to the raising or lowering of the temperature or pressure.
- (2) Note. The mere recitation of a range of temperatures or pressures is not considered sufficient to be considered as being different temperatures or pressures.

**74 Utilizing material during polymerization to prevent or remove reactor buildup, e.g., fouling, clogging, etc.:**

This subclass is indented under subclass 72. Subject matter wherein material that would normally form during a polymerization reaction and which would clog or foul the polymerization equipment is removed from or is

prevented or inhibited from forming by the use of a nonpolymerizable material, which material is other than a hydrocarbon or halogenated hydrocarbon used in solvent or diluent amount.

- (1) Note. Included herein but not limited to the specific examples are patents which specifically claim the use of materials to remove or inhibit forming of fouling materials by solvents, surfactant surface treatments during polymerization, or maintaining a fluid film between the polymerization equipment and the polymerizing materials.

SEE OR SEARCH THIS CLASS, SUBCLASS:

62, for a process of polymerizing in reactor or defined material or in reactor which has been treated prior to polymerization therein.

89+, for processes of polymerizing in a specific diluent or solvent wherein reaction buildup is alleviated by the inherent use of a solvating material; and for processes of polymerizing in a hydrocarbon or halogenated hydrocarbon diluent together with a specific material wherein the hydrocarbon or halogenated hydrocarbon may prevent fouling of the reactor.

239, through 352.2, appropriate product for processes of polymerizing in a hydrocarbon or chlorinated hydrocarbon diluent or solvent.

SEE OR SEARCH CLASS:

528, Synthetic Resins or Natural Rubbers, subclass 484, for processes of removing buildup on reactor or processing equipment subsequent to polymerization.

**75 Including step of synthesis of monomer or pre-polymer:**

This subclass is indented under subclass 72. Subject matter which includes the chemical synthesis of a monomer or a prepolymer and subsequent polymerization thereof.

- (1) Note. A prepolymer for purposes of the subclass is a low-molecular-weight-polymeric material prepared from a single source product and which is regarded

as an intermediate reactant rather than as a final product and which is further polymerizable by a continuation of the same reaction as used in preparing said prepolymer.

- (2) Note. Included herein are processes involving dimerization or trimerization of monomer.

SEE OR SEARCH CLASS:

260, Chemistry of Carbon Compounds, and its daughter classes, for a method of preparing a polymerizable monomer or prepolymer.

**76 Polymerizable material derived from petroleum fraction:**

This subclass is indented under subclass 75. Subject matter wherein the monomer or prepolymer is derived from a petroleum fraction.

- (1) Note. Included herein are processes of recovering hydrocarbon materials from a crude-natural source followed by a chemical reaction (e.g., dimerization, etc.) and subsequent final polymerization.

**77 Including step of purifying monomer:**

This subclass is indented under subclass 72. Subject matter which includes the step of purifying the ethylenic monomer.

- (1) Note. Purification for this subclass may be for any number of reasons (e.g., removing impurities which inhibit polymerization, removing impurities which may be undesirable in the final polymer, etc.).
- (2) Note. Included in this subclass are processes involving physical treatments (e.g., distillation, sorbent extraction, etc.) as well as processes involving chemical interaction of the impurity or undesired constituents.

SEE OR SEARCH THIS CLASS, SUBCLASS:

75, for processes of chemically modifying a monomer or prepolymer.

## SEE OR SEARCH CLASS:

528, Synthetic Resins or Natural Rubbers, subclasses 480+, for processes of purifying a polymer by either a chemical or physical process.

**78 Adding material to an on-going polymerization reaction, said addition being other than the continuous addition of the initial charge:**

This subclass is indented under subclass 72. Subject matter wherein material which is added to a zone, said zone containing material therein which is undergoing polymerization, and the addition of the material is other than by the continuous addition of the material contained in the initial change.

- (1) Note. For purposes herein, addition proper for this subclass involves any of the following (1) the addition of material to a polymerization zone and continuing the polymerization without any subsequent addition, or (2) the addition of materials to a polymerization zone followed by the addition of materials distinct from the previous material either in whole-amount or in the addition of the same material in different concentration, or (3) the addition of material to terminate polymerization, or (4) the addition of material with the addition involving a halting, interruption, pausing, or suspending of adding material at any time during the polymerization reaction or (5) the addition of a material to a zone wherein all of the other necessary materials are present except the one being added.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

72+, for a method of polymerization involving the continuous addition of material to a zone.

**79 Adding in an incremental or sequential manner:**

This subclass is indented under subclass 78. Subject matter wherein the material is added in an incremental or sequential manner.

- (1) Note. "Sequential or incremental" addition requires (1) the addition of material

involving a halting interruption, or pausing in the addition of the same material followed by a resumption of addition; or (2) the addition of materials to a polymerization zone followed by the addition of material distinct from the previous materials; or (3) the addition of disproportionate amounts of material so that the addition of one is completed prior to the completion of the addition of the other material.

**80 Polymerizing in the presence of water:**

This subclass is indented under subclass 79. Subject matter wherein the polymerization reaction is effected in the presence of water.

**81 Added material is other than monomer per se, or composition containing monomer:**

This subclass is indented under subclass 80. Subject matter wherein the added material is devoid of monomer.

**82 Adding polymerization inhibitor or terminator, e.g., short-stopper, etc.:**

This subclass is indented under subclass 78. Subject matter wherein the added material terminates or retards the polymerization reaction (e.g., polymerization inhibitor, terminator, chain-transfer agent, short-stopper, etc.).

**83 Added material contains nitrogen compound:**

This subclass is indented under subclass 82. Subject matter wherein the added terminating or inhibiting material contains a nitrogen-containing compound.

**84 Added material contains oxygen compound:**

This subclass is indented under subclass 82. Subject matter wherein the added terminating or retarding material contains an oxygen-containing compound.

- (1) Note. This subclass includes the use of water, per se, as a retarding or terminating agent.

**85 Added material contains sulfur atom:**

This subclass is indented under subclass 82. Subject matter wherein the added terminating or retarding material contains a sulfur atom.

- 86 Adding catalyst or catalyst component:**  
This subclass is indented under subclass 78. Subject matter wherein the added material is the catalyst or a part of the catalyst system.
- 87 Adding monomer:**  
This subclass is indented under subclass 78. Subject matter wherein the added material is an ethylenically unsaturated monomer.
- 88 Polymerization involving specified mixing, stirring, agitating, or movement of material:**  
This subclass is indented under subclass 72. Subject matter wherein the polymerization process involves specific mixing, stirring, agitating, or the movement of material.
- (1) Note. Specified for purposes of this subclass requires the naming of a movement-imparting rotor, stirrer, impeller or any other device in terms of its specified dimension, design, size, or shape thereof, or requires the recitation of a reactor of a design to facilitate movement or agitation; or requires a positive recitation in the claims as to velocity or designated time of mixing, said time being either continuous or intermittent.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
72+, for mere agitating during a polymerization reaction.
- 89 Polymerizing in the presence of a specified material other than monomer:**  
This subclass is indented under subclass 72. Subject matter wherein an ethylenically unsaturated monomer is polymerized in the presence of a specified material.
- SEE OR SEARCH CLASS:  
520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the term "specified material".
- 90 Material contains transition metal or compound thereof:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains at least one transition metal atom.
- (1) Note. "Transition metal" for purposes of this subclass is limited to elements of atomic numbers 21-29, 39-47, 57-79, and 89 and higher and does not include Zn, Cd, and Hg. "Nontransition metal" as used throughout this schedule is intended to include all metals other than the transition metals.
- (2) Note.
- (a) Nontransition metal atom-to-carbon bond as used throughout this schedule includes all compounds that contain at least one carbon atom bonded to at least one nontransition metal atom.
- (b) Nontransition metal hydride as used through this schedule includes all compounds that contain at least one hydrogen atom bonded to at least one nontransition metal.
- (c) Included within the scope of compounds encompassed by the definition of 2(a) and 2(b) above are those compounds having two or more nontransition metal atoms wherein additionally one of said atoms is bonded to a carbon or hydrogen atom and wherein one of said nontransition metal atoms is not bonded to a hydrogen or carbon atom.
- (3) Note.
- (a) Metal borohydrides (e.g.,  $\text{LiBH}_4$ ,  $\text{Ti}(\text{BH}_4)_3$ , etc.) are classified as if they are hydrides of boron and of the metal atom.
- (b) Mixed metal hydrides (e.g.,  $\text{NaAlH}_4$ ,  $(\text{CaAlH}_4)_2$ , etc.) are classified as if they are hydrides of aluminum and of the other metal.
- (c) In those instances where a carbon atom has replaced at least one or more hydrogen atoms of compounds as elaborated in 3(a) above, then classification is made as if these compounds are alternatively bonded to a boron atom and to a metal, and in those cases wherein a car-



bon atom has replaced at least one or more hydrogen atoms of compounds as elaborated in 3(b) above, then classification is made as if these compounds are alternatively bonded to either one of the metal atoms.

SEE OR SEARCH THIS CLASS, SUBCLASS:

132, for a mixture of  $\text{LiBH}_4$  and  $\text{TiCl}_4$ .

159, for a mixture of  $\text{NaAlH}_4$  and  $\text{TiCl}_4$ .

**91 In presence of water:**

This subclass is indented under subclass 90. Subject matter wherein transition material is in contact with water during the polymerization reaction.

- (1) Note. The amount of water present during the polymerization reaction is of no significance (e.g., diluent, catalyst, activator, etc.).
- (2) Note. Water of hydration, per se, is not considered as being water for this subclass.
- (3) Note. The use of a catalyst system or other material which has been prepared in the presence of water is not proper for this subclass unless it is understood that free water remains after the material has been formed.

**92 Carbon-metal bond:**

This subclass is indented under subclass 91. Subject matter wherein the transition metal atom is bonded to at least one carbon atom; or wherein the transition metal material is in admixture with a compound that contains at least one metal atom bonded to a carbon atom.

**93 Group VIII transition metal (Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt):**

This subclass is indented under subclass 91. Subject matter wherein at least one atom is a Group VIII metal (i.e., Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt).

**94 With organo-sulfur compound or organic-transition metal compound containing sulfur atom:**

This subclass is indented under subclass 93. Subject matter wherein (1) the transition metal atom exists as a part of a sulfur-containing organic compound; or (2) the transition metal material is in admixture with an organic sulfur-containing compound.

**95 Material contains transition metal oxide (other than peroxide):**

This subclass is indented under subclass 90. Subject matter wherein the specified material contains a transition metal atom as part of a binary compound solely composed of a single transition metal and oxygen.

- (1) Note. Included herein are supports for active ingredients wherein the support may be an oxide of a transition metal (e.g., thoria, titania, etc.).
- (2) Note. Excluded from this subclass are the peroxides of a transition metal.
- (3) Note. This subclass includes reaction products or reaction mixtures of transition metal oxides wherein the surface of the transition metal oxide may be modified (e.g.,  $\text{TiO}_2$  chemically bonded to  $\text{TiCl}_4$  on its surface) but wherein the material is still regarded as being in oxide form.

SEE OR SEARCH THIS CLASS, SUBCLASS:

172, for a binary peroxide containing a transition metal and oxygen.

**96 Contains elemental transition metal or a non-oxide compound of a transition metal:**

This subclass is indented under subclass 95. Subject matter wherein the specified material contains at least two transition metal atoms, one of said transitional metal atoms being in elemental form or as part of a nonbinary oxide compound.

- 97 Contains non-transition elemental metal, hydride thereof, or carbon to non-transition metal atom bond:**  
This subclass is indented under subclass 96. Subject matter wherein the specified material contains a nontransition metal in elemental form, or in the form of a hydride, or as a compound wherein the nontransition metal is bonded directly to a carbon atom.
- 98 Contains non-metallic halogen-containing material:**  
This subclass is indented under subclass 95. Subject matter wherein the specified material contains elemental halogen or a nonmetal halogen-containing compound.
- 99 Contains compound containing aluminum to halogen bond and wherein the same aluminum atom is not bonded to a hydrogen or carbon atom:**  
This subclass is indented under subclass 95. Subject matter wherein the specified material contains at least one aluminum compound having an aluminum atom bonded to halogen, and wherein said same aluminum atom is not bonded to a carbon or hydrogen atom.
- 100 Contains non-metal organic N, O, S or P containing compound:**  
This subclass is indented under subclass 95. Subject matter wherein the specified material contains at least one nonmetallic, organic, nitrogen, oxygen, sulfur or phosphorus-containing compound.
- 101 Two or more transition metal oxides, at least two of said oxides being other than oxides of Ti, Zr, Hf, or Th:**  
This subclass is indented under subclass 95. Subject matter wherein the specified material consists of at least two transition metal oxides, at least two of said transition metal oxides being other than oxides of Ti, Zr, Hf, or Th.
- (1) Note. Proper for this subclass are ternary systems containing three transitional metal oxides wherein one of the oxides is of Ti, Zr, Hf or Th and wherein the other two oxides are not of those transition metals.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
103, for a mixture of a Group VIII oxide and an oxide of Ti, Zr, Hf, or Th.  
104, for a mixture of a Group VIB oxide and/or oxide of Ti, Zr, Hf, or Th.
- 102 Contains non-transition heavy metal or compound thereof:**  
This subclass is indented under subclass 95. Subject matter wherein the specified material contains an elemental nontransitional heavy metal or a compound of a nontransition heavy metal.
- 103 Group VIII metal oxide (Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt):**  
This subclass is indented under subclass 95. Subject matter wherein the specified material contains an oxide of a Group VIII metal, i.e., Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt.
- 104 Group VIB metal oxide (Cr, Mo, W):**  
This subclass is indented under subclass 95. Subject matter wherein the specified material contains an oxide of a Group VIB metal, i.e., Cr, Mo, W.
- 105 Contains non-transition elemental metal, hydride thereof, or nontransition metal to carbon atom bond:**  
This subclass is indented under subclass 104. Subject matter wherein the specified material contains an elemental nonheavy metal, or contains a hydride of a nonheavy metal, or contains a compound having a nonheavy metal to carbon bond.
- 106 Metal oxide is of chromium:**  
This subclass is indented under subclass 104. Subject matter wherein the specified material contains an oxide of chromium.
- 107 Group IVB metal oxide (Ti, Zr, Hf):**  
This subclass is indented under subclass 95. Subject matter wherein the specified material contains an oxide of a Group IVB metal, i.e., Ti, Zr, Hf.

**108 Contains one or more elemental transition metal atoms:**

This subclass is indented under subclass 90. Subject matter wherein the specified material contains a transition metal in elemental form.

- (1) Note. Included within the term elemental metal are alloys.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

62, for processes of polymerizing in a reactor wherein one of the reactor surfaces which contacts the polymerizing material is a transition metal in elemental form.

**109 With peroxy compound (-O-O-):**

This subclass is indented under subclass 108. Subject matter wherein the specified material contains an elemental transition metal in admixture with a compound that contains an -O-O-group.

**110 With non-transition elemental metal, hydride thereof, or carbon to non transition metal atom bond:**

This subclass is indented under subclass 108. Subject matter wherein the specified material contains an elemental transition metal which is in admixture with a nontransition metal, or is in admixture with a hydride of a nontransition metal, or is in admixture with a compound of a nontransition metal wherein a nontransition metal atom is directly bonded to a carbon atom.

**111 Contains Group VIII metal atom (Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt):**

This subclass is indented under subclass 110. Subject matter wherein the specified material contains at least one nonmetallic material which contains a nitrogen, oxygen, sulfur or phosphorus atom.

- (1) Note. Excluded from this area is the use of nitrogen or air as merely carrier or blanket gases.

**112 With transition metal compound With transition metal compound:**

This subclass is indented under subclass 108. Subject matter wherein the specified material contains an elemental transition metal which is in admixture with a transition metal compound.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

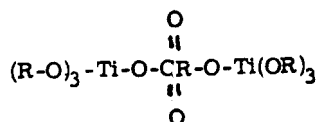
108, for an admixture of two or more elemental transition metal atoms, e.g., alloys, etc.

**113 Two or more diverse transition metal atoms in distinct compounds or in the same compound:**

This subclass is indented under subclass 90. Subject matter wherein the specified material contains (1) two compounds having diverse transition metal atoms; or (2) a single compound having at least two diverse transition metal atoms therein, e.g.,

SEE OR SEARCH THIS CLASS, SUB-CLASS:

118+, for a specified material containing two or more compounds of the same transition metal.

**114 Contains non-transition elemental metal, hydride thereof, or carbon to non transition metal atom bond:**

This subclass is indented under subclass 113. Subject matter wherein the specified material contains a nontransition metal in elemental form, or contains a hydride of a nontransition metal, or contains a compound of a nontransition metal wherein a nontransition metal atom is directly bonded to a carbon atom.

**115 Contains Group VIII metal atom (Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt):**

This subclass is indented under subclass 114. Subject matter wherein at least one of the transition atoms present is a Group VIII element, i.e., Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt.

- 116 At least one Group IVB metal atom (Ti, Zr, Hf) and at least one Group VB metal (V, Nb, Ta):**  
This subclass is indented under subclass 114. Subject matter wherein at least one of the transition metal atoms present is a Group IVB atom and wherein at least one of the different transition metal atoms present is a Group VB atom (e.g.,  $\text{TiCl}_4$  and  $\text{VOCl}_3$ , etc.).
- (1) Note. A Group IV atom is Ti, Zr, Hf. A Group VB atom is V, Nb, Ta.
- 117 Contains Group VIII metal atom (Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt):**  
This subclass is indented under subclass 113. Subject matter wherein at least one of the transition metal atoms present is a Group VIII element, i.e., Fe, Co, Ni, Ru, Rh, Pd, Os, Ir, Pt.
- 118 Material contains two or more different compounds of same transition metal:**  
This subclass is indented under subclass 90. Subject matter wherein the specified material contains at least two different transition metal compounds, each of said compounds containing the same transition metal atom.
- (1) Note. Excluded from this subclass are compositions containing two or more distinct compounds of the same transition elements when such compositions are the result of a reaction wherein a part of the original transition metal compound is converted to a different compound form (e.g., partial reduction of  $\text{TiCl}_4$  with  $\text{AlR}_3$ ) to form a mixture of  $\text{TiCl}_4$  and  $\text{TiCl}_3$ , etc. However, a patent claim wherein  $\text{TiCl}_4$  and  $\text{TiCl}_3$  are separately added would be proper herein.
- 119 Contains non-transition elemental metal, hydride thereof, or carbon to non-transition metal atom bond:**  
This subclass is indented under subclass 118. Subject matter wherein the specified material contains a nontransition metal in elemental form, or contains a hydride of a nontransition metal, or contains a compound of a nontransition metal wherein a nontransition metal atom is directly bonded to a carbon atom.
- 120 Material contains compound of non-transition heavy metal wherein non-transition heavy metal is not bonded to hydrogen or carbon:**  
This subclass is indented under subclass 90. Subject matter wherein (1) the specified material contains a transition metal compound which is in admixture with a compound containing a heavy metal atom and which heavy metal is other than a heavy metal atom directly bonded to a carbon atom or to a hydrogen atom; or (2) wherein a transition metal containing compound additionally contains at least one heavy metal atom in the same molecule, which heavy metal atom is not directly bonded to a hydrogen or carbon atom (e.g., mercuric tungstate, or a mixture of  $\text{NiCl}_2$  and  $\text{ZnCl}_2$ , etc.).
- 121 Contains non-transition elemental metal, hydride thereof, or carbon to non-transition metal atom bond:**  
This subclass is indented under subclass 120. Subject matter wherein the specified material contains a nontransition metal in elemental form, or contains a hydride of a nontransition metal, or contains a compound of a nontransition metal wherein a nontransition metal atom is directly bonded to a carbon atom.
- (1) Note. Included in this subclass are compounds which may contain two heavy metal atoms and wherein one of the metal atoms may be attached to a carbon or hydrogen atom and wherein the other heavy metal atom is not attached to a hydrogen or carbon atom.
- 122 Nontransition heavy metal compound is halogen-containing:**  
This subclass is indented under subclass 121. Subject matter wherein the heavy metal compound contains a halogen atom (e.g.,  $\text{SnCl}_4$ ,  $(\text{R-O})_3\text{SnCl}$ , etc.).
- 123.1 Material contains compound of Group IA (Li, Na, K, Rb, Cs, Fr) or Group IIA (Be, Mg, Ca, Sr, Ba, Ra) metal wherein IA or IIA**

**metal is not bonded to hydrogen or to carbon:**

This subclass is indented under subclass 90. Subject matter wherein the specified material contains a transition metal compound which is in admixture with a Group IA or IIA metal compound, which compound is other than a Group IA or Group IIA metal hydride or compound containing a Group IA or Group IIA metal atom bonded directly to a carbon atom; or wherein a transition metal-containing compound additionally contains at least one Group IA or Group IIA metal atom in the same molecule, which Group IA or Group IIA metal atom is not bonded directly to a hydrogen or carbon atom (e.g.,  $\text{Ca}(\text{NR}_2)_2$ ,  $\text{NaNH}_2$ , etc.).

- (1) Note. Included in this subclass are compounds which may contain two alkali metal atoms and wherein one of the alkali metal atoms may be attached to a carbon or hydrogen atom and wherein the other alkali metal atom is not attached to a carbon or hydrogen atom (e.g.,  $\text{NaCH}_2\text{CH}_2\text{ONa}$ , etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:

167, for a specified material containing a transition metal compound and an elemental Group IA or Group IIA metal atom.

**124.1 Contains nontransition elemental metal, hydride thereof, or carbon to non-transition metal atom bond:**

This subclass is indented under subclass 123.1. Subject matter wherein the specified material contains a nontransition metal in elemental form, or contains a hydride of a nontransition metal, or contains a compound of a nontransition metal wherein the nontransition metal is directly bonded to a carbon atom.

- (1) Note. Examples of substances provided for herein as contained in the specified material are lithium metal,  $\text{MgH}_2$ ,  $\text{Al}(\text{C}_2\text{H}_5)_3$ , and  $\text{C}_2\text{H}_5\text{MgCl}$ .

**124.2 Contains a magnesium compound as the Group IIA metal compound:**

This subclass is indented under subclass 124.1. Subject matter wherein the specified material contains a magnesium compound having no carbon to magnesium or hydrogen to magnesium bonds.

- (1) Note. Examples of substances provided for herein as contained in the specified material are  $\text{MgCl}_2$ ,  $\text{MgO}$ , and  $\text{Mg}(\text{OC}_2\text{H}_5)_2$ .

SEE OR SEARCH THIS CLASS, SUBCLASS:

941, for a cross-reference art collection pertaining to the subject matter of this subclass and its indents.

**124.3 Contains at least one additional specified material:**

This subclass is indented under subclass 124.2. Subject matter wherein an additional specified material is present (i.e., there are four or more specified materials present).

- (1) Note. This subclass provides, inter alia, for the combination of  $\text{TiCl}_4$ ,  $\text{MgCl}_2$ ,  $\text{Al}(\text{CH}_3)_3$  and an additional specified material such as  $\text{Al}(\text{C}_2\text{H}_5)_3$ ,  $\text{PCl}_3$  or alcohol.
- (2) Note. Material such as  $\text{Mg}_m \text{Ti}(\text{OR})_m \text{X}_p [\text{ED}]_q$  wherein R is hydrocarbon, X is halogen and ED is a specified material such as a carboxylic acid ester will be considered to represent a mixture of specified materials rather than a unitary compound. In this particular mixture, ED represents the additional specified material which satisfies the requirement of this subclass.
- (3) Note. For purpose of this and indented subclasses, materials such as  $\text{MgCl}_2 \cdot 2\text{H}_2\text{O}$  are generally regarded as constituting two specified materials (i.e.,  $\text{MgCl}_2$  and  $\text{H}_2\text{O}$ ). See Search This Class, Subclass, infra.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

124.4, for  $\text{MgCl}_2 \cdot 2\text{H}_2\text{O}$  considered as a single specified material.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the term "specified material".

**124.4 Contains two or more magnesium compounds having no H to magnesium or C to magnesium bonds or at least one additional said Group IA or IIA compound:**

This subclass is indented under subclass 124.3. Subject matter wherein there is present (1) two different magnesium compounds neither of which contains a carbon to magnesium or a hydrogen to magnesium bond, or (2) a Group IA metal or nonmagnesium Group IIA metal compound, neither of which contains a bond between carbon or hydrogen and the Group IA or Group IIA metal.

(1) Note. An example of (1), *supra*, is the combination of  $\text{MgCl}_2$  and  $\text{Mg}(\text{OC}_2\text{H}_5)_2$ . An example of (2), *supra*, is  $\text{MgCl}_2 \cdot \text{KCl} \cdot 6\text{H}_2\text{O}$ .

**124.5 Contains Si or Al inorganic oxygen-containing compound:**

This subclass is indented under subclass 124.3. Subject matter wherein the additional specified material is an inorganic compound that contains oxygen and silicon or oxygen and aluminum.

(1) Note. Examples of additional specified materials provided for herein are  $\text{SiO}_2$ ,  $\text{Al}_2\text{O}_3$ , and  $\text{H}_3\text{Si-O-SiH}_3$ .

**124.6 Contains organic non-metal containing B, Si, N, P, or chalcogen material:**

This subclass is indented under subclass 124.5. Subject matter wherein an organic material that contains boron, silicon, nitrogen, phosphorus or chalcogen is present and does not contain metal.

(1) Note. Examples of material provided for herein are  $\text{B}(\text{C}_2\text{H}_5)_3$ , ethyl acetate,  $\text{CH}_3\text{SiHCl}_2$ , etc.

(2) Note. Chalcogen is defined as oxygen, sulfur, selenium, or tellurium.

**124.7 Contains at least two non-transition elemental metals, hydrides thereof, or compounds containing carbon to non-transition metal atom bond, or mixtures thereof:**

This subclass is indented under subclass 124.3. Subject matter wherein there are present plural nontransition elemental metals, hydrides thereof, or compounds of a nontransition metal wherein the nontransition metal is bonded directly to a carbon atom or to a hydrogen atom, or mixtures thereof.

(1) Note. Examples of combinations provided for herein are: (1) lithium metal and  $\text{Al}(\text{C}_2\text{H}_5)_3$ , (2)  $\text{MgH}_2$  and  $\text{C}_2\text{H}_5\text{MgCl}$ , (3)  $\text{Mg}(\text{C}_2\text{H}_5)_2$  and  $\text{Mg}(\text{CH}_3)_2$ , (4) lithium metal and calcium metal.

**124.8 Contains organic non-metal containing B, Si, N, P, or chalcogen material:**

This subclass is indented under subclass 124.7. Subject matter wherein an organic material that contains boron, silicon, nitrogen, phosphorus or chalcogen is present and does not contain metal.

(1) Note. Chalcogen is defined as oxygen, sulfur, selenium, or tellurium.

**124.9 Contains organic non-metal containing B, Si, N, P, or chalcogen material:**

This subclass is indented under subclass 124.3. Subject matter wherein the additional specified material is an organic material that contains boron, silicon, nitrogen, phosphorus or chalcogen and does not contain metal.

(1) Note. Chalcogen is defined as oxygen, sulfur, selenium, or tellurium.

- 125.1 Contains organic Al compound containing no H to aluminum or C to aluminum bonds:**  
This subclass is indented under subclass 124.9. Subject matter wherein an organic aluminum compound which is devoid of any bonds between the aluminum and carbon or hydrogen atoms is present.
- (1) Note. Examples of compounds provided for herein are  $\text{Al}(\text{OC}_2\text{H}_5)_3$  and  $\text{Al}[\text{N}(\text{C}_2\text{H}_5)_2]_2\text{Cl}$ .
- 125.2 Contains compound containing only C, H and halogen atoms or only C and halogen atoms:**  
This subclass is indented under subclass 124.9. Subject matter wherein a compound which contains only (1) carbon, hydrogen and halogen atoms, or (2) carbon and halogen atoms is present.
- (1) Note. Examples of compounds provided for herein are  $\text{CCl}_4$  and  $\text{CHCl}_3$ .
- 125.3 Contains organic non-metal containing B or Si material:**  
This subclass is indented under subclass 124.9. Subject matter wherein an organic material which contains boron or silicon but does not contain metal is present.
- (1) Note. Examples of materials provided for herein are  $\text{B}(\text{OC}_2\text{H}_5)_3$ ,  $\text{Si}(\text{C}_2\text{H}_5)_4$ , and  $\text{Si}(\text{CH}_3)\text{Cl}_3$ .
- 125.4 Contains at least one inorganic material having no H to metal bonds:**  
This subclass is indented under subclass 124.9. Subject matter wherein an inorganic material having no bonds between hydrogen and metal is present.
- (1) Note. Examples of materials provided for herein are  $\text{HSiCl}_3$ ,  $\text{MgCl}_2$ ,  $\text{H}_2\text{O}$  and  $\text{BCl}_3$ .
- 125.5 At least one of said inorganic materials is an Al halide:**  
This subclass is indented under subclass 125.4. Subject matter wherein the inorganic material is an aluminum halide.
- 125.6 Contains at least two organic non-metal containing N, P, or chalcogen materials:**  
This subclass is indented under subclass 124.9. Subject matter wherein there are at least two different organic materials present, each contains nitrogen, phosphorus or chalcogen and does not contain metal.
- (1) Note. Examples of combinations of materials provided for herein are (1)  $\text{P}(\text{OC}_2\text{H}_5)_3$  and  $\text{C}_2\text{H}_5\text{OH}$ , and (2)  $\text{CH}_3\text{OH}$  and  $\text{C}_2\text{H}_5\text{OH}$ .
- (2) Note. Chalcogen is defined as oxygen, sulfur, selenium, or tellurium.
- 125.7 Contains compound containing only C, H and halogen atoms or only C and halogen atoms:**  
This subclass is indented under subclass 124.3. Subject matter wherein the additional specified material is a compound which contains only (1) carbon, hydrogen and halogen atoms, or (2) carbon and halogen atoms.
- (1) Note. Examples of compounds provided for herein are  $\text{CCl}_4$  and  $\text{CHCl}_3$ .
- 125.8 Contains at least one inorganic material having no H to metal bonds:**  
This subclass is indented under subclass 124.3. Subject matter wherein the additional specified material is an inorganic material having no bonds between hydrogen and metal.
- 126 Material contains silicon atom:**  
This subclass is indented under subclass 90. Subject matter wherein the specified material contains a transition metal compound which is in admixture with a silicon-containing material, or wherein the transition metal compound additionally contains at least one silicon atom therein.
- (1) Note. Included herein are those processes that claim the use of silica.

- 127 Contains non-transition free metal, hydride thereof, or carbon to non-transition metal atom bond:**  
This subclass is indented under subclass 126. Subject matter wherein the specified material contains a nontransition metal in elemental form, or contains a hydride of a nontransition metal, or contains a compound of a nontransition metal wherein a nontransition metal atom is directly bonded to a carbon atom.
- 128 Silicon present in organic non-metal compound:**  
This subclass is indented under subclass 127. Subject matter wherein the silicon-containing material is a nonmetallic organic compound.
- 129 Silicon present in inorganic oxygen-containing compound:**  
This subclass is indented under subclass 127. Subject matter wherein the silicon-containing material is an inorganic oxygen-containing compound, e.g.,  $\text{H}_3\text{Si-O-SiH}_3$ , etc.
- 130 Silicon present in inorganic oxygen-containing compound:**  
This subclass is indented under subclass 126. Subject matter wherein a the silicon-containing material is an inorganic oxygen-containing compound, e.g.,  $\text{SiO}_2$ ,  $\text{H}_3\text{Si-O-SiH}_3$ , etc.
- 131 Material contains boron atom:**  
This subclass is indented under subclass 90. Subject matter wherein the specified material contains a transition-metal compound which is in admixture with a boron-containing material, or wherein the transition-metal compound, additionally, contains at least one boron atom therein.
- 132 Contains non-transition elemental metal, hydride thereof, or carbon to non transition metal atom bond:**  
This subclass is indented under subclass 131. Subject matter wherein the specified material contains a nontransition metal in elemental form, or contains a hydride of a nontransition metal, or contains a compound of a nontransition metal wherein a nontransition metal atom is directly bonded to a carbon atom, e.g., transition-metal compound and  $\text{LiBH}_4$ , etc.
- 133 Boron compound is halogen-containing:**  
This subclass is indented under subclass 132. Subject matter wherein the boron compound contains at least one halogen atom, e.g.,  $\text{B}_3\text{N}_3\text{H}_3\text{Cl}_3$  (trichloroborazole), etc.
- 134 Boron compound contains boron bonded to hydrogen or to carbon atom:**  
This subclass is indented under subclass 131. Subject matter wherein the boron compound contains a boron to hydrogen bond, or a boron to carbon bond (e.g.,  $\text{Ti}(\text{BH}_4)_3$ ,  $\text{TiCl}_4$  and  $\text{B}(\text{C}_2\text{H}_5)_3$ , etc.).
- 135 With non-metal N, P, O, S, Se, Te, or halogen material other than nitrogen gas:**  
This subclass is indented under subclass 90. Subject matter wherein the specified material contains a transition metal compound in admixture with at least one nonmetal-containing material having at least one atom of nitrogen, phosphorus, oxygen, sulfur, selenium, tellurium, or halogen.
- (1) Note. Nitrogen gas, per se, is not a basis for classification herein. Such claims are classified elsewhere on some other basis.
- (2) Note. Patents which disclose air but do not specifically claim air as a needed component of the composition are excluded herefrom and will be classified elsewhere on some other basis.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
91, for a process of polymerizing in the presence of water and a transition metal or transition metal compound.
- 136 Contains non-transition elemental metal, hydride thereof, or carbon to non transition metal atom bond:**  
This subclass is indented under subclass 135. Subject matter wherein the specified material contains a nontransition metal in elemental form, or contains a hydride of a nontransition metal, or contains a compound of a nontransition metal wherein a nontransition metal atom is directly bonded to a carbon atom.



- 137 Non-metal material is inorganic halogen-containing material:**  
This subclass is indented under subclass 136. Subject matter wherein the nonmetal material is elemental halogen or is a nonmetallic-inorganic-halogen-containing compound.
- 138 Non-metal material is inorganic oxygen-containing material:**  
This subclass is indented under subclass 136. Subject matter wherein the nonmetal material is elemental oxygen or is a nonmetallic inorganic-oxygen-containing compound.
- 139 Non-metal material is organic phosphorus-containing compound:**  
This subclass is indented under subclass 136. Subject matter wherein the nonmetal material is an organic compound containing at least one phosphorus atom.
- 140 Non-metal material is organic sulfur-containing compound:**  
This subclass is indented under subclass 136. Subject matter wherein the nonmetal material is an organic compound containing at least one sulfur atom.
- 141 Non-metal material is organic nitrogen-containing compound:**  
This subclass is indented under subclass 136. Subject matter wherein the nonmetal material is an organic compound containing at least one nitrogen atom.
- 142 Non-metal material is organic oxygen-containing compound:**  
This subclass is indented under subclass 136. Subject matter wherein the nonmetal material is an organic compound containing at least one oxygen atom.
- 143 Non-metal organic oxygen compound is halogen-containing:**  
This subclass is indented under subclass 142. Subject matter wherein the nonmetal oxygen compound contains at least a halogen atom in the same molecule as the oxygen atom.
- 144 Non-metal material is organic halogen-containing compound:**  
This subclass is indented under subclass 136. Subject matter wherein the nonmetal material is an organic compound containing at least one halogen atom.
- 145 Non-metal phosphorus-containing material:**  
This subclass is indented under subclass 135. Subject matter wherein the nonmetal material is elemental phosphorus or is a phosphorus-containing compound.
- 146 Non-metal sulfur-containing material:**  
This subclass is indented under subclass 135. Subject matter wherein the nonmetal material is elemental sulfur or is a sulfur-containing compound.
- 147 Non-metal nitrogen-containing material:**  
This subclass is indented under subclass 135. Subject matter wherein the nonmetal material is a nitrogen-containing compound.
- 148 Contains two or more diverse non-transition elemental metals, different non-transition hydride compounds, different carbon to non transition metal compounds, or mixture thereof:**  
This subclass is indented under subclass 90. Subject matter wherein the specified material contains a transition metal compound (1) in admixture with two or more diverse elemental nontransition metals; or (2) in admixture with at least two different nontransition metal hydride compounds; or (3) in admixture with at least two different nontransition metals to carbon-bonded compounds; or (4) in admixture with a nontransition elemental metal and a non-transition metal hydride compound or a non-transition metal-to-carbon-bonded compound; or (5) is in admixture with a nontransition metal hydride compound and a nontransition metal-to-carbon-bonded compound.
- (1) Note. Different for purposes herein regards to the compounds of a nontransition metal bonded to hydrogen or carbon is meant to include the same nontransition metal existing in different compounds, e.g., one being the hydride and the other containing a nontransition metal to carbon bonds, or even two dif-

ferent compounds of the same nontransition metal each bonded to carbon, but in different compounds, or in different hydride forms.

**149 At least one atom of As, Sb, or Bi, in elemental form or bonded to hydrogen or carbon atom:**

This subclass is indented under subclass 148. Subject matter wherein the specified material contains an atom of a Group VA (As, Sb, Bi)metal in elemental form, or contains a hydride of a Group VA metal, or contains a compound of a Group VA metal wherein the Group VA metal is directly bonded to a carbon atom.

**150 At least one atom of Ge, Sn, or Pb in elemental form or bonded to hydrogen or carbon atom:**

This subclass is indented under subclass 148. Subject matter wherein the specified material contains an atom of a Group IVA (Ge, Sn, Pb)metal in elemental form, or contains a hydride of a Group IV metal, or contains a compound of a Group IVA metal wherein the Group IVA metal atom is directly bonded to a carbon atom.

**151 At least one atom of Group IIIA metal (Al, Ga, In, Tl) in elemental form or bonded to hydrogen or carbon atom:**

This subclass is indented under subclass 148. Subject matter wherein the specified material contains an atom of a Group IIIA (Al, Ga, In, Tl) metal in elemental form, or contains a hydride of a Group IIIA metal, or contains a compound of a Group IIIA metal wherein the Group IIIA metal is directly bonded to a carbon atom.

**152 At least one atom of Group IA metal (Li, Na, K, Rb, Cs, Fr) in elemental form or bonded to hydrogen or carbon atom:**

This subclass is indented under subclass 151. Subject matter wherein in addition to the Group IIIA material the specified material contains at least one Group IA element in elemental form, or contains a hydride of a Group IA metal, or contains a compound of a Group IA metal wherein the Group IA metal is directly bonded to a carbon atom.

SEE OR SEARCH THIS CLASS, SUBCLASS:

123.1+, for a compound of a Group IA element wherein the Group IA element is not bonded to any hydrogen or carbon atoms.

**153 Two or more Group IIIA metals in elemental form or bonded to hydrogen or carbon atom:**

This subclass is indented under subclass 151. Subject matter wherein the specified material contains (1) two or more Group IIIA metals in elemental form, two or more Group IIIA metal hydrides, or two or more compounds which contain a carbon to Group IIIA metal bond; or (2) a mixture composed of at least two of any of the Group IIIA materials noted in (1).

**154 Material contains aluminum compound wherein aluminum atom is not bonded to hydrogen or carbon atom:**

This subclass is indented under subclass 90. Subject matter wherein (1) the specific material contains a transition metal compound which is in admixture with a compound of aluminum, which aluminum compound is other than the hydride or other than a compound wherein an aluminum atom is directly bonded to a carbon atom, or (2) wherein a transition metal-containing compound additionally contains at least one aluminum atom in the same molecule, which aluminum atom is not directly bonded to a hydrogen or carbon atom.

**155 Contains non-transition elemental metal, hydride thereof or carbon to non transition metal atom bond:**

This subclass is indented under subclass 154. Subject matter wherein the specified material contains a nontransition metal in elemental form, or contains a hydride of a nontransition metal, or contains a compound of a nontransition metal wherein the nontransition metal atom is directly bonded to a carbon atom.

**156 Inorganic oxygen containing aluminum compound:**

This subclass is indented under subclass 155. Subject matter wherein the specified material contains an inorganic oxygen-containing compound of aluminum.

- 157 Aluminum trihalide:**  
This subclass is indented under subclass 155. Subject matter wherein the specified material contains aluminum trihalide.
- 158 With Group IVB transition metal compound (Ti, Zr, Hf):**  
This subclass is indented under subclass 157. Subject matter wherein the transition metal compound contains at least one atom of a Group IVA metal (i.e., Ti, Zr, Hf).
- 159 Material contains non-transition elemental metal, hydride thereof, or carbon to non-transition metal atom bond:**  
This subclass is indented under subclass 90. Subject matter wherein the specified material contains a nontransition metal in elemental form, or contains a hydride of a nontransition metal, or contains a compound of a nontransition metal wherein the nontransition metal atom is directly bonded to a carbon atom (e.g.,  $\text{TiCl}_4$  and  $\text{LiAlH}_4$ , etc.).
- 160 Transition metal bonded to carbon atom:**  
This subclass is indented under subclass 159. Subject matter wherein a transition metal atom is bonded to a carbon atom (e.g.,  $\text{Ti}(\text{CR}_3)_3$ , tetra lithium ferrocenyl, etc.).
- 161 Transition metal compound contains P, S, or N atom:**  
This subclass is indented under subclass 159. Subject matter wherein a transition metal compound contains at least one atom of phosphorus, sulfur, or nitrogen, in the same molecule as the transition metal atom (e.g., titanium nitride,  $\text{MoS}_2$ , ferric hydrosulfate, etc.).
- 162 Non-transition metal is bonded to carbon atom in compound which contains ethylenic unsaturation:**  
This subclass is indented under subclass 159. Subject matter wherein at least one carbon atom is directly bonded to a nontransition metal atom and the molecule contains in addition at least one ethylenic unsaturated moiety.
- SEE OR SEARCH CLASS:  
520, Synthetic Resins or Natural Rubbers, Glossary, for the definition of "ethylenically unsaturated".
- 163 Non-transition metal hydride or carbon to non-transition metal metal atom bond compound contains P, S, or N atom:**  
This subclass is indented under subclass 159. Subject matter wherein at least one nontransition metal is bonded to a hydrogen or carbon atom and the same molecule contains in addition at least one atom of phosphorus, nitrogen or sulfur; e.g.,  $\text{AlH}_3\text{N}(\text{CH}_3)_3$ ,  $\text{H}_2\text{AlN}(\text{CH}_3)_2$ .
- 164 Transition metal is IB, IIIB, VIIB or atomic number 58-71, 88, 90 or higher:**  
This subclass is indented under subclass 159. Subject matter wherein the transition metal of the transition metal compound is a Group IB, IIIB, or VIIB atom, or has an atomic number of 58-71, or 90 and higher.
- 165 Non-transition metal to carbon atom bond compound contains at least two atoms of same or different non-transition metal:**  
This subclass is indented under subclass 159. Subject matter wherein a nontransition metal to carbon contains (1) at least two atoms of the same nontransition metal; or (2) at least two diverse nontransition atoms, (e.g.,  $\text{Sb}(\text{C}_2\text{H}_5)_4\text{ClAl}_2(\text{C}_2\text{H}_5)_6$ ,  $\text{LiAlR}_4$ , etc.).
- (1) Note. Included herein are those compounds that contains a repeat unit (e.g.,  $(\text{CH}_2\text{AlR})_n$ , etc.).
- 166 Group IVA (Ge, Sn, Pb) or Group VA (As, Sb, Bi) metal is bonded to hydrogen or carbon atom:**  
This subclass is indented under subclass 159. Subject matter wherein a group IVA or Group VA metal atom is directly bonded to an atom of hydrogen or carbon.
- 167 Elemental non-transition metal atom:**  
This subclass is indented under subclass 159. Subject matter wherein the nontransition metal atom exists in elemental form.
- 168 Elemental carbon:**  
This subclass is indented under subclass 159. Subject matter wherein in addition to the non-transition metal compound there is also present elemental carbon.

- 169 Transition metal is Group VB, VIB or VIII metal:**  
This subclass is indented under subclass 159. Subject matter wherein the transition metal compound contains a Group VB, VIB, or VIII metal atom.
- 169.1 Transition metal is Group VIII:**  
This subclass is indented under subclass 169. Subject matter wherein the transition metal compound contains a Group VIII metal atom.
- 169.2 Transition metal is vanadium:**  
This subclass is indented under subclass 169. Subject matter wherein the transition metal compound contains a vanadium atom.
- 169.3 At least one monomer is nonhydrocarbon material:**  
This subclass is indented under subclass 159. Subject matter wherein at least one monomer is other than a hydrocarbon.
- (1) Note. This subclass includes the interpolymerized product of a hydrocarbon monomer and a nonhydrocarbon monomer as well as homopolymeric products of nonhydrocarbon monomers.
- 170 Transition metal bonded to carbon atom:**  
This subclass is indented under subclass 90. Subject matter wherein the specified material contains at least one transition metal atom bonded to a carbon atom.
- 171 Transition metal is Group VIII (Fe, Co, Ni, Ru, Ph, Pd, Os, Ir, Pt):**  
This subclass is indented under subclass 170. Subject matter wherein the transition metal is a Group VIII metal.
- 172 Material contains elemental alkali metal, hydride thereof, or alkali metal to carbon atom bond (Li, Na, K, Rb, Cs, Fr):**  
This subclass is indented under subclass 90. Subject matter wherein the transition metal compound contains at least one atom of phosphorus, sulfur, nitrogen, or oxygen chemically combined therewith.
- 173 Material contains elemental alkali metal, hydride thereof, or alkali metal to carbon atom bond (Li, Na, K, Rb, Cs, Fr):**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains an elemental alkali metal, and alkali metal hydride, or a compound containing an alkali metal bonded to a carbon atom.
- (1) Note. Alkali metal is limited to the elements of Group IA and as such is limited to Li, Na, K, Rb, Cs, and Fr.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
90+, for processes of polymerizing in the presence of a transition metal atom and a Group IA element or compound thereof.  
176, through 182, which may include compounds wherein the alkali metal is bonded to a carbon or hydrogen atom and in the same molecule there is also present at least one of the necessary elements required under the definitions of these subclasses.
- 174 Contains at least two diverse alkali metal atoms, at least one of which is in the form of a free alkali metal, or in the form of a hydride, or has an alkali metal to carbon atom bond:**  
This subclass is indented under subclass 173. Subject matter wherein the specified material contains two or more different alkali metals in elemental or compound form and at least one of the alkali metals is a free alkali metal, alkali metal hydride, or a compound containing an alkali metal atom bonded to a carbon atom.
- (1) Note. Included herein are compounds which contain two diverse alkali metals in a single compound or alloy.
- 175 Contains two or more separate chemical entities containing atoms of the same alkali metal, with at least one atom in elemental form, or in the form of a hydride, or has an alkali metal to carbon atom bond:**  
This subclass is indented under subclass 173. Subject matter wherein the specified material contains (1) an elemental alkali metal admixed with a compound of the same alkali metal; or

- (2) wherein an alkali metal hydride or compound containing an alkali metal-to-carbon bond is admixed with another compound of the same alkali metal (e.g., Na and sodium t-dodecyl mercaptide, or butyl lithium, and LiH, etc.).
- 176 Contains heavy metal atom:**  
This subclass is indented under subclass 173. Subject matter wherein the specified material contains a heavy metal atom.
- 177 Contains aluminum atom:**  
This subclass is indented under subclass 173. Subject matter wherein the specified material contains aluminum (e.g.,  $\text{LiAlH}_4$ , etc.).
- 178 Contains boron or silicon atom:**  
This subclass is indented under subclass 173. Subject matter wherein the specified material contains boron or silicon (e.g.,  $\text{LiBH}_4$ , etc.).
- 179 Contains phosphorus atom:**  
This subclass is indented under subclass 173. Subject matter wherein the specified material contains phosphorus.
- 180 Contains compound of nitrogen:**  
This subclass is indented under subclass 173. Subject matter wherein the specified material contains a nitrogen-containing compound.
- 181 Contains oxygen atom:**  
This subclass is indented under subclass 173. Subject matter wherein the specified additive contains oxygen.
- (1) Note. This subclass includes only specified compositions wherein there is a desired and intentional contact between air and the Group IA material and does not include the use of air as a blanket or carrier gas.
- 182 Contains halogen atom:**  
This subclass is indented under subclass 173. Subject matter wherein the specified additive contains a halogen atom.
- 183 Material contains metal atom bonded to a carbon atom:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains a metal atom bonded to a carbon atom.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
192, for a polymerization process in the presence of a heavy metal-containing organic compound wherein the metal is not bonded to a carbon atom.
- 184 With free oxygen or peroxy compound (-O-O-):**  
This subclass is indented under subclass 183. Subject matter wherein the carbon to metal bonded compound is in admixture with a compound that contains a -O-O- group or in admixture with free oxygen.
- (1) Note. This subclass includes only specified compositions wherein there is a desired and intentional contact between air and the compound having a carbon atom bonded to a metal atom and does not include the use of air as a blanket or carrier gas.
- 185 Metal bonded to carbon is aluminum:**  
This subclass is indented under subclass 183. Subject matter wherein the specified material contains a compound wherein an atom of aluminum is bonded to a carbon atom.
- 186 Contains aluminum not bonded to carbon:**  
This subclass is indented under subclass 185. Subject matter wherein the specified material contains at least one atom of aluminum not bonded to a carbon atom.
- 187 Contains Group IA or IIA atom:**  
This subclass is indented under subclass 185. Subject matter wherein the specified material contains a Group IA or Group IIA metal atom.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
173+, for a specified material containing a Group IA metal atom in elemental form, Group IA hydride, or compound

- containing a Group IA metal bonded to a carbon atom.
- 188 Contains heavy metal atom:**  
This subclass is indented under subclass 185. Subject matter wherein the specified material contains a heavy metal atom.
- 189 Contains P, N, S, or O atom:**  
This subclass is indented under subclass 185. Subject matter wherein the specified material contains phosphorus, nitrogen, sulfur, or oxygen.
- (1) Note. Excluded from this area is the use of nitrogen or air as carrier or blanket gases.
- 190 Metal bonded to carbon atom is a heavy metal atom:**  
This subclass is indented under subclass 183. Subject matter wherein the specified material contains a heavy metal atom bonded to a carbon atom.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
188, for an admixture of an organoaluminum compound together with an organo heavy metal compound.
- 191 Material contains elemental metal:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains a metal in elemental form.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
108+, for a specified material containing an elemental transition metal.  
173+, for an specified material containing an elemental Group IA metal.
- 192 Material contains a heavy metal atom containing organic compound:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains at least a heavy metal atom as part of an organic compound.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
90+, for a specified additive containing a transition metal atom.
- 176, for a specified additive containing a heavy metal atom and at least one atom of an elemental Group IA metal, hydride thereof, or carbon atom bonded to a Group IA metal atom.
- 183, for a process of polymerizing in the presence of a metal compound wherein a metal atom is directly bonded to a carbon atom of an organic radical.
- 193 Material contains organic compound having a phosphorus atom:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains at least one atom of phosphorus in an organic compound.
- 194 Material contains Si, Te, Se, or Group VIIIA atom, e.g., He, Ne, etc.:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains silicon, tellurium, selenium, or a Group VIIIA atom.
- (1) Note. This subclass includes use of clays and diatomaceous earths as part of a specified material.
- 195 Material contains boron compound other than boron trihalide or non-metal organic complex of boron trihalide:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains a compound of boron which boron compound is other than (1) boron trihalide, per se; or (2) boron trihalide complexed with a nonmetal organic moiety.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
237+, for a polymerization process in the presence of boron trihalide, per se, or boron trihalide complexed with a non-metal organic moiety, e.g., boron trihalide-etherate complex, etc.
- 196 Boron bonded to hydrogen or carbon atom compound:**  
This subclass is indented under subclass 195. Subject matter wherein the boron compound contains at least one boron atom bonded to a carbon or hydrogen atom.

**197 With free oxygen or peroxy compound:**

This subclass is indented under subclass 196. Processes wherein the boron compound is in admixture with free oxygen or with a compound that contains an -O-O- group.

- (1) Note. This subclass includes only specified compositions wherein there is a desired and intentional contact between air and the boron compound and does not include the use of air as a blanket or carrier gas.

**198 Contains P, S, or N atom other than as elemental nitrogen:**

This subclass is indented under subclass 196. Subject matter wherein the boron compound contains at least one atom of phosphorus, sulfur, or nitrogen in the same molecule; or wherein the boron compound is in admixture with an elemental form of phosphorus or sulfur; or wherein the boron compound is in admixture with a compound form of phosphorus, sulfur, or nitrogen.

**199 Material contains polypeptide, e.g., protein, gelatin, etc.:**

This subclass is indented under subclass 89. Subject matter wherein the specified material contains a protein or a protein-reaction product, e.g., gelatin, silk, etc.

- (1) Note. A protein reaction product requires at the minimum the presence of a peptide group, i.e., an amide group between the amino radical of one amino acid and the carboxyl radical of another amino acid.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 215, for a polymerization process in the presence of a nitrogen-containing carboxylic acid, salt, ester, or anhydride thereof.

**200 Material contains carbohydrate, e.g., starch, sugar, etc.:**

This subclass is indented under subclass 89. Processes wherein the specified material contains a carbohydrate or reaction product thereof, e.g., cellulose, starch, etc.

- (1) Note. A carbohydrate "reaction product" requires that the basic carbohydrate skeleton not be destroyed.

**201 Material contains previously formed normally solid polymer which is distinct from polymer to be formed and is a polymer formed from at least one ethylenic monomer:**

This subclass is indented under subclass 89. Subject matter wherein the specified material contains at least one distinct normally solid preformed polymer which has been derived from at least one ethylenically unsaturated material.

- (1) Note. Polymers proper for this subclass must be either distinct from the polymers formed either in the nature or amounts of individual monomers therein, or in the manner in which they are formed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 102, for a process of polymerizing in the presence of a transition metal-containing material and a preformed ethylenic polymer.  
204, for a process of polymerizing in the presence of a melamine-formaldehyde reaction product.  
208, for a process of polymerizing in the presence of a urea-formaldehyde reaction product.  
213+, for a process of polymerizing in the presence of a reaction product of a saturated carboxylic acid and a polyhydric alcohol.

SEE OR SEARCH CLASS:

- 525, Synthetic Resins or Natural Rubbers, subclasses 50+, for a process of polymerizing an ethylenically unsaturated monomer in the presence of a solid preformed polymer wherein the intent is to form a resinous composition containing the previously formed polymer or wherein the preformed polymer reacts with the ethylenic monomer to form a modified previously formed solid polymer.

**202 Normally solid polymer contains free alcohol group or alcoholate thereof:**

This subclass is indented under subclass 201. Subject matter wherein the preformed normally solid polymer contains at least one free hydroxyl group or nonheavy metal salt thereof.

- (1) Note. The preformed polymer intended primarily for this subclass, but not limited thereto, is of the type that has been formed by the hydrolysis or after-treatment of a preformed polyvinyl acetate polymer and is known generally as polyvinyl alcohol.

**203 Normally solid polymer is formed from ethylenically unsaturated dicarboxylic acid, ester, salt, or anhydride thereof:**

This subclass is indented under subclass 201. Subject matter wherein the preformed normally solid polymer is derived from at least one ethylenically unsaturated polycarboxylic acid.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the term "carboxylic acid or derivative" which discusses polycarboxylic acids.

**204 Material contains heterocyclic compound:**

This subclass is indented under subclass 89. Subject matter wherein the specified material contains a compound which has one or more carbon atoms covalently bonded in a closed ring with at least one atom of oxygen, sulfur, or nitrogen and which has no other atoms in the ring.

SEE OR SEARCH THIS CLASS, SUBCLASS:

194, for a compound having selenium or tellurium atoms in a heterocyclic ring.

**205 Sulfur and nitrogen together in a single ring:**

This subclass is indented under subclass 204. Subject matter wherein the ring containing compound has at least one atom of sulfur and nitrogen in a single closed ring.

**206 Material contains halogenated hydrocarbon wherein at least one halogen atom is other than chlorine, and mixtures of water and a****halogenated hydrocarbon one ethylenic monomer:**

This subclass is indented under subclass 89. Subject matter wherein (1) the polymerization reaction is conducted in the presence of a halogenated hydrocarbon wherein at least one halogen atom is not chlorine or (2) wherein the polymerization is conducted in the presence of a halogenated hydrocarbon and water.

- (1) Note. A halogenated hydrocarbon is a compound (1) solely composed of halogen and carbon atoms; or (2) of halogen, carbon, and hydrogen atoms.

SEE OR SEARCH THIS CLASS, SUBCLASS:

239, 352.2, appropriate subclasses therein, for a process of polymerizing in the presence of a chlorinated hydrocarbon.

**207 Material contains water and a hydrocarbon:**

This subclass is indented under subclass 89. Subject matter wherein the specified additive contains water and a compound solely composed of carbon and hydrogen.

SEE OR SEARCH THIS CLASS, SUBCLASS:

239, 352.2, appropriate subclasses therein, for a process of polymerizing in the presence of a hydrocarbon.

**208 Material contains aldehyde or ketone or polymeric reaction product thereof, e.g., urea-formaldehyde, etc.:**

This subclass is indented under subclass 89. Subject matter wherein the specified additive is a ketone or aldehyde.

- (1) Note. Included herein as being proper for this subclass are urea-formaldehyde reaction products.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the terms "aldehyde" and "ketone".

**209 Material contains ether:**

This subclass is indented under subclass 89. Subject matter wherein the polymerization reaction is conducted in the presence of at least



one compound which contains at least one oxygen atom bonded to two discrete organic radicals and having the general formula, i.e., -C-O-C-.

- (1) Note. This subclass includes ethers derived from phenols.
- (2) Note. This subclass does not include nonmetallic ether complexes of a boron trihalide or of an aluminum trihalide.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 213+, for a polymerization process in the presence of a carboxylic acid, R -OH, OR ester, salt or anhydride thereof.
- 237+, for a process of polymerizing in the presence of an etherate complex of boron trihalide or aluminum trihalide (e.g., BF<sub>3</sub>-etherate, etc.)

SEE OR SEARCH CLASS:

- 520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the term "ether".

**210 Material contains alcohol or alcoholate:**

This subclass is indented under subclass 89. Subject matter wherein the specified material contains a hydroxyl group bonded to carbon or wherein the hydrogen atom of a hydroxyl group has been replaced by a metal.

- (1) Note. This subclass includes phenols.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 192, for polymerization in the presence of a compound wherein the hydrogen atom of a hydroxyl group has been replaced by a heavy metal.
- 237+, for a process of polymerizing in the presence of an alcohol or alcoholate complex of boron trihalide or aluminum trihalide (e.g., BF<sub>3</sub>-alcoholate, etc.).

SEE OR SEARCH CLASS:

- 520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the term "alcohol".

**211 Alcohol or alcoholate has at least one atom of nitrogen or sulfur chemically combined therewith:**

This subclass is indented under subclass 210. Subject matter wherein the hydroxyl-containing compound contains at least one atom of nitrogen or sulfur therein.

- (1) Note. This subclass includes a sulfur or nitrogen salt of an alcohol group.

**212 Alcohol contains a single hydroxy group or is alcoholate thereof:**

This subclass is indented under subclass 210. Subject matter wherein the hydroxy compound contains a single hydroxyl group or salt thereof.

**213 Material contains carboxylic acid, salt, ester, or anhydride thereof:**

This subclass is indented under subclass 89. Subject matter wherein the specified material contains at least one compound which has a carboxylic acid group, salt, ester, or anhydride thereof.

- (1) Note. This subclass includes oxalic acid, formic acid and derivatives thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 192, for a polymerization process in the presence of a compound wherein the hydrogen atom of a carboxylic acid group has been replaced by a heavy metal atom.
- 227+, for an organic per-acid.
- 237+, for an organic complex or boron trihalide or aluminum trihalide wherein the organic portion of the complex is derived from a carboxylic acid.

SEE OR SEARCH CLASS:

- 520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the term "carboxylic acid or derivative".
- 525, Synthetic Resins or Natural Rubbers, subclasses 1+, for a resin composition containing a fat, fatty oil acid or salt thereof as an additive, or for a fat, fatty oil, fatty oil acid or salt thereof which is capable of reacting with or is part of a resinous material.

- 214 Derived from carboxylic acid containing at least one atom of halogen or sulfur:**  
This subclass is indented under subclass 213. Subject matter wherein the specified material contains (1) a halogen or sulfur substituted carboxylic acid; or (2) an ester, salt, or anhydride of a sulfur or halogen substituted carboxylic acid.
- 215 Derived from carboxylic acid containing at least one atom of nitrogen:**  
This subclass is indented under subclass 213. Subject matter wherein the specified material contains (1) a nitrogen-containing carboxylic acid; or (2) an ester, salt or anhydride of a nitrogen-containing carboxylic acid.
- 216 Derived from aliphatic acid:**  
This subclass is indented under subclass 213. Subject matter wherein the specified material contains a carboxylic acid which is devoid of any aromatic or cycloaliphatic group, or contains an ester, salt, or anhydride of a carboxylic acid which is devoid of any aromatic or cycloaliphatic group.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
204+, for a specified material containing a heterocyclic compound having carboxylic acid group or for an ester, salt, or anhydride derivative thereof.
- 217 Material contains organic nitrogen compound:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains an organic compound having at least one nitrogen atom.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
199, for a polymerization process in the presence of a polypeptide.  
211, for a polymerization process in the presence of a nitrogen-containing alcohol or alcoholate.  
215, for a polymerization process in the presence of a nitrogen-containing carboxylic acid, salt, ester, or anhydride thereof.
- 218.1 Organic compound contains N=N or N-N group:**  
This subclass is indented under subclass 217. Subject matter wherein the specified material contains at least two atoms of nitrogen which are bonded to each other by a single or double bond (e.g., 1, 1-dimethylhydrazine, p-dimethylaminoazobenzene, etc.).
- 219 Organic N-N or N=N containing compound also contains at least one S or O chemically bound therein:**  
This subclass is indented under subclass 218.1. Subject matter wherein the organic nitrogen containing compound having the -N-N or N=N group has at least one atom of sulfur or oxygen chemically bound therein.
- 219.1 Organic N=N or N-N Group-containing compound contains carbocyclic group or element other than C, H, or N:**  
This subclass is indented under subclass 218.1. Subject matter wherein the compound containing either the N=N or N-N group also contains either a carbocyclic group, e.g., benzene, cyclopropyl or cyclohexyl group, etc. or an element other than C, H, or N, e.g., the hydrochloride salt of 2, 2'-diguanyl-2, 2' -azopropane, etc.
- 219.2 N=N or N-N group-containing compound is a catalyst admixed with at least one other catalyst, co-catalyst, or accelerator, e.g., redox catalyst, etc.:**  
This subclass is indented under subclass 218.1. Subject matter wherein the N=N or N-N group-containing compound is part of a catalyst system, i.e., admixed with another catalyst, co-catalyst or accelerator (e.g., 1, 1-dimethylhydrazine and hydrogen peroxide, azobisisobutyronitrile and benzoyl peroxide, etc.).
- (1) Note. Included herein also are those systems wherein a monomer is first complexed with a catalyst and the complexed monomer is copolymerized in the presence of a free radical initiator with at least one other monomer, e.g., zinc chloride-acrylonitrile complex copolymerized in the presence of benzoylperoxide with 2-methyl-1-pentene, etc.

**219.3 Contains specified ingredient other than the N=N or N-N group-containing compound or water, or defined hydrocarbon or defined halogenated hydrocarbon:**

This subclass is indented under subclass 218.1. Subject matter wherein the polymerization process uses a specified material in addition to one containing an N=N or N-N group, e.g., an admixture of azobisisobutyronitrile dissolved in benzene or toluene, etc.

- (1) Note. See the Class Definition, Lines With Other Classes and Within This Class, section II. B, for a discussion of the lines between this subclass and other subclasses in this Class. A patent which recites a polymerization process which utilizes (a) a material proper for subclasses 218.1+ in combination with either a specified or nonspecified amount of "hydrocarbon or halohydrocarbon" will not be classified in subclass 219.3 or its indents, but will be found in 219.6 or 218.1+; proper, however, for subclass 219.3 or its indents is the situation wherein when either the hydrocarbon or halohydrocarbon is defined in some degree (e.g., dihalogenated, dibrominated, contains specified chain length, boiling or freezing point range, etc.); (b) a "free radical" catalyst with either a specified or nonspecified amount of "hydrocarbon or halohydrocarbon" will be classified with the polymer providing this was the only remaining basis for classification.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, Glossary, for a further elaboration on the limitations on the use of these materials in this class.

**219.4 Ingredient contains halogenated hydrocarbon:**

This subclass is indented under subclass 219.3. Subject matter wherein the polymerization process uses a halogenated hydrocarbon in addition to the compound containing the N=N or N-N group, e.g., azobisisobutyronitrile in admixture with ethylene dichloride, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

219.3+, for the limitations set out in using a halogenated hydrocarbon.

- (1) Note. See the Class Definition, Lines with Other Classes and Within This Class, section II. B, for a discussion of limitations regarding "halogen hydrocarbon" as a basis of classification.

**219.5 Ingredient contains water, e.g., an emulsion, dispersion, etc.:**

This subclass is indented under subclass 219.3. Subject matter wherein the polymerization process uses water in addition to the compound containing the N=N or N-N group, e.g., an aqueous emulsion polymerization process using azobisisobutyronitrile catalyst, etc.

**219.6 Azobisisobutyronitrile (AIBN):**

This subclass is indented under subclass 218.1. Subject matter wherein the compound which contains the N=N or N-N group is azobisisobutyronitrile (AIBN) or the same compound described in chemically equivalent terms, i.e., 2, 2-azobisisobutyronitrile, 2, 2-azobis(2-methylpropionitrile), alpha, alpha - azodisobutyronitrile, dinitrile azoisobutyrate, azodisobutyric acid nitrile, etc.

SEE OR SEARCH CLASS:

521, Synthetic Resins or Natural Rubbers, Glossary, subclasses 50+ for a process of utilizing AIBN both to polymerize a monomer as well as to foam the resulting polymer.

**220 Organic nitrogen compound contains at least one S or O atom chemically bound therein:**

This subclass is indented under subclass 217. Subject matter wherein the nitrogen containing organic compound has at least one atom of sulfur or oxygen chemically bound therein.

**221 Material contains inorganic heavy metal compound:**

This subclass is indented under subclass 89. Subject matter wherein the specified material contains at least one compound having a heavy metal atom therein.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 90+, for a polymerization process in the presence of a transition metal atom.
- 188, for a polymerization process in the presence of an organoaluminum compound which may also contain a heavy metal therein, or in presence of a composition of an organoaluminum compound and an elemental or compound form of a heavy metal.
- 190, for a polymerization process in the presence of a heavy metal-organocarbon bond.
- 191, for a polymerization process in the presence of an elemental heavy metal.
- 192, for a polymerization process in the presence of an organic compound which contains a heavy metal therein.
- 222 Material contains organic sulfur compound:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains an organic compound having at least one sulfur atom therein.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 189, for an organoaluminum compound which may contain an atom of sulfur.
- 198, for an organoboron-containing compound which may contain an atom of sulfur.
- 211, for a sulfur-containing alcohol or alcoholate.
- 214, for a sulfur-containing carboxylic acid, salt, ester, or anhydride thereof.
- 219, for an organic nitrogen-containing compound which has at least one N-N or N=N group and which may have a sulfur atom therein.
- 220, for an organic nitrogen compound which has at least one atom of sulfur therein.
- 223 Organic sulfur compound contains -S-S- or -O-O-group:**  
This subclass is indented under subclass 222. Subject matter wherein the organic sulfur compound contains at least one -S-S- or O-O group or chemically bound therewith.
- 224 Mercaptan:**  
This subclass is indented under subclass 222. Processes wherein the organic sulfur-containing compound is a mercaptan, i.e., -C-SH.
- (1) Note. For purposes of this subclass, the carbon atom bound to the -SH group cannot be double bonded to oxygen or sulfur.
- 225 Organic compound contains hexavalent S atom, e.g., organosulfate, sulfonate, etc.:**  
This subclass is indented under subclass 222. Subject matter wherein the organic sulfur compound contains at least one hexavalent sulfur atom (e.g., sulfonic acids, sulfonates, organo sulfates, etc.).
- 226 Material contains aluminum compound other than aluminum trihalide or nonmetallic organic complex of aluminum trihalide:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains a compound of aluminum which aluminum compound is other than (1) aluminum trihalide, per se; or (2) aluminum trihalide complexed with a nonmetal organic moiety.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 237+, for a polymerization process in the presence of aluminum trihalide, per se, or aluminum trihalide complexed with a nonmetal organic moiety.
- 227 Material contains peroxy group compound (-O-O-):**  
This subclass is indented under subclass 89. Subject matter the specified material contains a compound having at least one -O-O- group.
- (1) Note. Processes wherein a known peroxide is formed in situ by the reaction of a peroxide and another compound are classified on the basis of the peroxide that is utilized to form the in situ peroxide and cross-reference to the in situ formed peroxide.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
- 90+, for a transition metal compound admixed with a peroxide compound

- or for a compound containing a transition metal and an -O-O- group therein.
- 184, for an organometallic compound admixed with a peroxy compound.
- 197, for a boron compound other than a boron trihalide or nonmetallic organic complex, per se, admixed with a peroxy compound.
- 223, for an organosulfur compound containing an -O-O- group therein.
- 228 Two or more peroxide compounds:**  
This subclass is indented under subclass 227. Subject matter wherein the specified material contains two or more distinct compounds having an -O-O- group therein.
- 229 Inorganic peroxide, e.g., persulfate, hydrogen peroxide, etc.:**  
This subclass is indented under subclass 227. Subject matter wherein the -O-O- group-containing compound is inorganic in nature (e.g., sodium persulfate, percarbonates, etc.).
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
90+, for a transition metal peroxide.  
195, for a polymerization reaction in the presence of sodium perborate.
- 229.5 Nitrogen- or halogen-containing inorganic -O-O- compound free of sulfur, or wherein an O-O- compound is in admixture with a compound devoid of sulfur and containing a N, halogen or P atom:**  
This subclass is indented under subclass 229. Subject matter wherein the -O-O- group is part of a sulfur-free inorganic nitrogen- or halogen-containing compound, or wherein an inorganic compound containing the -O-O- group is in admixture with a sulfur-free nitrogen, halogen, or phosphorus compound.
- 230 Hydroperoxide:**  
This subclass is indented under subclass 227. Subject matter wherein the -O-O- group-containing compound contains an R-O-O-H group.
- 230.5 Peroxy carbonate:**  
This subclass is indented under subclass 227. Subject matter wherein the -OO group-containing compound contains a C-OC-O- group or a -OO-O- group.
- 231 Peroxide contains halogen atom chemically combined therein:**  
This subclass is indented under subclass 227. Subject matter wherein the -O-O- compound has at least one halogen atom chemically combined therewith.
- 232 Peroxide contains an aryl group:**  
This subclass is indented under subclass 227. Subject matter wherein the -O-O- containing compound has at least one aromatic group therein.
- 232.1 Benzoyl peroxide:**  
This subclass is indented under subclass 232. Subject matter wherein the -O-O- group-containing compound is benzoyl peroxide, i.e.,
- The diagram shows the chemical structure of benzoyl peroxide. It consists of two benzene rings (represented as hexagons with a circle inside) connected by a peroxide bridge (-O-O-). Each carbon atom of the peroxide bridge is also bonded to a carbonyl group (=O). The structure is symmetrical.
- 232.3 Two or more peroxy groups in same compound:**  
This subclass is indented under subclass 227. Subject matter wherein the -O-O- group-containing compound contains at least two -O-O- groups.
- 232.5 Cycloaliphatic or ethylenically unsaturated peroxy-containing compound:**  
This subclass is indented under subclass 227. Subject matter wherein the -O-O- group-containing compound contains a carbon ring which is other than an aryl, or contains an ethylenically unsaturated group.
- 233 Material contains elemental phosphorus or inorganic phosphorus compound:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains elemental phosphorus or an inorganic compound containing phosphorus therein.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
90+, for a transition metal-containing material containing a phosphorus atom or admixed with a phosphorus atom.

- 179+, for an elemental alkali metal atom admixed with a phosphorus-containing material, and for a Group IA hydride or Group IA organometallic compound containing a phosphorus.
- 183+, for a phosphorus-containing organometallic material wherein the metal is other than a transition metal or Group IA metal.
- 193+, for a material containing an organic phosphorus-containing compound.
- 234 Material contains sulfur or inorganic sulfur compound:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material is elemental sulfur or an inorganic compound containing sulfur therein.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 90+, for a transition metal material containing a sulfur atom.
- 183+, for a sulfur-containing organometallic material wherein the metal is other than a transition metal or Group IA metal.
- 235 Material contains free oxygen, air, or ozone:**  
This subclass is indented under subclass 89. Subject matter wherein the specified additive contains oxygen, air, or ozone.
- (1) Note. This subclass does not include the use of air as a blanket or carrier gas.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 227+, for a polymerization reaction in the presence of an oxygen-liberating peroxide compound.
- 236 Material contains nitrogen compound:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains an inorganic nitrogen compound.
- 237 Material contains metal halide, boron halide or organic complexes thereof, hydrogen halide, elemental halogen, or compound containing only halogen atoms:**  
This subclass is indented under subclass 89. Subject matter wherein the specified material contains (1) elemental halogen; or (2) a boron halide or nonmetallic organic complex thereof; or (3) a hydrogen halide; or (4) an aluminum trihalide or a nonmetallic organic complex thereof; or (5) a compound containing only halogen atoms; or (6) a metallic halide other than transition metal, aluminum or a nontransition heavy metal.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
- 195+, for polymerizing in the presence of a boron compound which is other than boron trihalide or a nonmetallic organic complex thereof.
- 221, for polymerizing in the presence of a halide of a heavy metal.
- 226, for polymerizing in the presence of an aluminum compound which is other than aluminum trihalide or a nonmetallic organic complex thereof.
- 238 At least one monomer is nonhydrocarbon material:**  
This subclass is indented under subclass 237. Subject matter wherein at least one monomer is other than a hydrocarbon.
- (1) Note. This subclass includes the interpolymerization of a hydrocarbon monomer and a nonhydrocarbon monomer as well as homopolymers of nonhydrocarbon monomers.
- 238.1 From protein or biologically active polypeptide containing monomer:**  
This subclass is indented under subclass 72. Subject matter wherein at least one ethylenic monomer has chemically bonded thereto a protein or biologically active polypeptide, or wherein said protein or biologically active polypeptide has been modified so as to introduce ethylenic unsaturation.
- SEE OR SEARCH CLASS:
- 435, Chemistry: Molecular Biology and Microbiology, for processes of preparing and using enzymes.
- 520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the terms "protein" and "biologically active polypeptide"
- 527, Synthetic Resins or Natural Rubbers, subclasses 100+ and 200+ for solid polymers containing chemically

reacted protein material and wherein there is also at least one nonethylenically unsaturated reactant.

**238.2 From carbohydrates, tannin or derivative containing monomer:**

This subclass is indented under subclass 72. Subject matter wherein at least one ethylenic monomer has chemically bonded thereto a carbohydrate or derivative, or tannin or derivative; or wherein said carbohydrate or tannin or derivative has been modified so as to introduce ethylenic unsaturation therein.

SEE OR SEARCH CLASS:

- 520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of "carbohydrates" and "carbohydrate derivative".  
560, Organic Compounds, subclass 68, the definition thereof for a description of "tannins".

**238.21 Cellulose or derivative containing monomer:**

This subclass is indented under subclass 238.2. Subject matter wherein the monomer contains cellulose or derivative.

SEE OR SEARCH CLASS:

- 524, Synthetic Resins or Natural Rubbers, subclass 35 for a definition of cellulose.

**238.22 Starch or derivative containing monomer, e.g., starch-acrylamide, etc.:**

This subclass is indented under subclass 238.2. Subject matter wherein the monomer contains starch or a starch material or derivative.

SEE OR SEARCH CLASS:

- 524, Synthetic Resins or Natural Rubbers, subclass 47 for a definition of starch or starch material (e.g., cereal or starch flour, etc.) or derivative.

**238.23 Mono- or di-saccharide containing monomer, e.g., allyl sucrose, etc.:**

This subclass is indented under subclass 238.2. Subject matter wherein the carbohydrate is a mono- or di-saccharide monomer.

SEE OR SEARCH CLASS:

- 524, Synthetic Resins or Natural Rubbers, subclass 56 or a definition of di-saccharide, and subclass 58 for a definition of a mono-saccharide.

**238.3 From natural resin or derivative containing monomer:**

This subclass is indented under subclass 72. Subject matter wherein at least one ethylenic monomer has chemically bonded thereto a natural resin or derivative thereof; or wherein an ethylenically unsaturated natural resin is copolymerized with an additional ethylenic monomer.

- (1) Note. Resin copolymerized with another ethylenic monomer which is not a natural resin or natural resin derivative is classified herein. Also, rosin copolymerized with another ethylenic monomer which is a natural resin having synthetically introduced ethylenic unsaturation is classified herein.

SEE OR SEARCH CLASS:

- 520, Synthetic Resins or Natural Rubbers, Lines With Other Classes and Within This Class, section II. B, for a further elaboration of the subject matter relating to natural resin or derivatives thereof.  
527, Synthetic Resins or Natural Rubbers, subclasses 600+ for synthetic resins derived from natural resins proper for that class.  
530, Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 200+ for nonsolid polymeric or nonpolymeric reaction products of natural resins or derivatives with unsaturated terpenes and/or unsaturated polycarboxylic acids, halides, or anhydrides.

**239 From boron containing monomer:**

This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains at least one boron atom.

- 240 From metal containing monomer:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains at least one metal atom.
- (1) Note. This subclass includes unsaturated compounds wherein the metal atoms are covalently or ionically bound.
- 241 Transition metal containing:**  
This subclass is indented under subclass 240. Subject matter wherein at least one of the metal atoms is a transition metal.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
90, for a clarification of the term "transition metal"
- 242 From fluorine containing monomer:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains at least one fluorine atom.
- 243 Fluorine-containing monomer contains a sulfur atom:**  
This subclass is indented under subclass 242. Subject matter wherein the fluorine monomer contains at least one sulfur atom.
- 244 Fluorine-containing monomer is a ketone or aldehyde:**  
This subclass is indented under subclass 242. Subject matter wherein the fluorine monomer contains an aldehyde or ketone group.
- (1) Note. A reactant having a  $=C=C=O$  group is a ketone. Ketenes are regarded as ketones herein.
- SEE OR SEARCH CLASS:  
520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the terms "aldehyde" and "ketone".
- 245 Fluorine containing monomer is a monocarboxylic acid ester:**  
This subclass is indented under subclass 242. Subject matter wherein the fluorine monomer contains a single carboxylic acid ester group.
- 246 Alcohol derived portion of ester contains ether group:**  
This subclass is indented under subclass 245. Subject matter wherein the alcohol portion of the carboxylic ester moiety contains at least one ether group, e.g., -O-R-O-R, etc.
- (1) Note. This subclass includes ethers derived from aromatic alcohols.
- 247 Fluorine containing monomer is an ether:**  
This subclass is indented under subclass 242. Subject matter wherein the fluorine monomer contains an ether oxygen atom connecting two carbon atoms.
- 248 Fluorine containing monomer contains nitrogen atom:**  
This subclass is indented under subclass 242. Subject matter wherein the fluorine monomer contains at least one nitrogen atom.
- 249 Fluorine containing monomer contains at least one diverse halogen atom:**  
This subclass is indented under subclass 242. Subject matter wherein the fluorine monomer contains at least one halogen atom which is other than fluorine (e.g., trichlorofluoroethylene, etc.).
- 250 Fluorine containing monomer contains F, C and H only or F and C only:**  
This subclass is indented under subclass 242. Subject matter wherein the fluorine monomer contains (1) atoms only of carbon, fluorine and hydrogen; or (2) atoms only of carbon and fluorine.
- 251 Aromatic:**  
This subclass is indented under subclass 250. Subject matter wherein the fluorine monomer contains at least one aromatic ring.
- 252 Fluorine compound contains two or more ethylenic groups:**  
This subclass is indented under subclass 250. Subject matter wherein the fluorine monomer contains at least two moieties wherein a carbon atom is bonded to another carbon atom by a double or triple bond.



**253 Five or more fluorine atoms:**  
This subclass is indented under subclass 250. Subject matter wherein the fluorine monomer contains at least five fluorine atoms.

**254 Contains only carbon and fluorine atoms:**  
This subclass is indented under subclass 253. Subject matter wherein the fluorine monomer contains only atoms of carbon and fluorine.

**255 Two or more fluorine atoms, e.g., vinylidene fluoride, etc.:**  
This subclass is indented under subclass 250. Subject matter wherein the fluorine monomer contains at least two fluorine atoms.

**256 From monomer containing sulfur atom as part of a heterocyclic ring:**  
This subclass is indented under subclass 72. Subject matter wherein an unsaturated monomer contains one or more carbon atoms covalently bonded in a ring system with at least one hetero atom of oxygen, nitrogen, sulfur, selenium, or tellurium and there are no other atoms in the ring, with the proviso that at least one of the atoms in the ring is sulfur.

**257 Sulfur-containing ring contains additional hetero atom, i.e., N, O, Se, Te:**  
This subclass is indented under subclass 256. Subject matter wherein at least one hetero ring contains as hetero atoms therein at least one sulfur atom and at least one atom of oxygen, nitrogen, selenium, or tellurium.

**258 From monomer containing nitrogen atom as part of a heterocyclic ring:**  
This subclass is indented under subclass 72. Subject matter wherein an unsaturated monomer contains one or more carbon atoms covalently bonded in a ring system with at least one hetero atom or oxygen, nitrogen, selenium or tellurium and there are no other atoms in the ring, with the proviso that at least one of the hetero atoms is nitrogen.

**259 Nitrogen atom is part of a bridged or fused ring system:**  
This subclass is indented under subclass 258. Subject matter wherein the monomer contains a fused or bridged ring system, and wherein at least one atom thereof is nitrogen.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

280+, for a monomer containing nitrogen atom which is part of a bridged or fused ring compound and wherein the nitrogen atom is extracyclic to the ring system and for a more thorough definition of what is meant by a fused or bridged ring system.

**260 5- or 6-membered nitrogen ring compound having at least one oxygen in the ring:**  
This subclass is indented under subclass 258. Subject matter wherein the ring system contains five or six atoms and at least one of the atoms besides carbon and nitrogen, is oxygen.

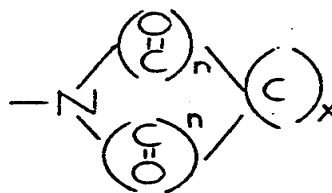
SEE OR SEARCH THIS CLASS, SUB-CLASS:

275+, for a ring compound containing a phosphorous atom in the ring.

**261 Three or more nitrogen atoms in a single ring:**  
This subclass is indented under subclass 258. Subject matter wherein the ring system contains at least three nitrogen atoms.

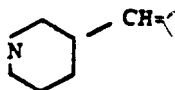
**262 Imide monomer:**  
This subclass is indented under subclass 258. Subject matter wherein at least one nitrogen heterocyclic ring contains an imide group.

(1) Note. An imide for purposes of this subclass denotes a heterocyclic ring, i.e., illustrated below, wherein n is 1 or more and wherein x is 1 or more.



**263 Nitrogen of ring is bonded directly or indirectly to extracyclic ethylenic moiety:**  
This subclass is indented under subclass 258. Subject matter wherein the nitrogen atom of a ring system is bonded either directly or indirectly to an extracyclic unsaturated group.

- (1) Note. This subclass includes only directly bonded unsaturated groups as in C=C-or only indirectly unsaturated bonded groups as in CH<sub>2</sub>=C - C - and is not meant to include unsaturated groups which are bonded to nonnitrogen ring atoms, e.g.,



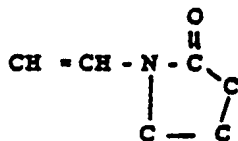
- (2) Note. Extracyclic as used herein is meant to exclude those compounds wherein the heterocyclic nitrogen compound contains unsaturation solely in the ring. The extracyclic unsaturation as required for this subclass can exist in a ring compound which is bonded to the nitrogen atom of the ring either directly or indirectly.

SEE OR SEARCH THIS CLASS, SUBCLASS:

258+, for a nitrogen-containing heterocyclic monomer wherein the ethylenic unsaturation is linked indirectly to the nitrogen atom in a ring through other atoms in the heterocyclic ring system.

**264 Lactam monomer:**

This subclass is indented under subclass 263. Subject matter wherein the nitrogen ring system contains only carbon atoms and a single nitrogen atom in the ring and wherein said N atom is bonded to a carbon atom in the ring which is doubly bonded to an extracyclic oxygen atom ( N) and there are no oxygen, sulfur, selenium, or tellurium atoms doubly bonded directly to any other carbon atoms of the ring system, e.g.,



etc.

**265 6-membered ring contains a single nitrogen atom:**

This subclass is indented under subclass 258. Subject matter wherein the nitrogen-containing ring contains six atoms and wherein only one of the atoms is nitrogen.

**266 From monomer containing oxygen as part of a heterocyclic ring:**

This subclass is indented under subclass 72. Subject matter wherein an unsaturated monomer contains at least one or more carbon atoms covalently bonded in a ring system with at least one hetero atom of oxygen, selenium or tellurium and there are no other atoms in the ring, with the proviso that at least one of the hetero atoms is oxygen.

SEE OR SEARCH THIS CLASS, SUBCLASS:

260, for a 5- or 6-membered heterocyclic ring containing at least one atom of oxygen and nitrogen therein.  
275, for a ring compound containing a phosphorus atom in the ring.

**267 Polymer contains coumarone and indene:**

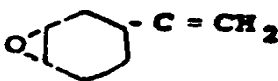
This subclass is indented under subclass 266. Subject matter wherein the interpolymer is formed from at least two monomers, one of said monomers being a coumarone type material and the other monomer is of the indene type.

- (1) Note. The polymers herein need not contain coumarone, per se, and indene, per se. It is sufficient for this subclass if derivatives of these compounds are polymerized. Derivatives are considered as being those products wherein the hydrogen atoms of these compounds have been replaced by other functional groups.

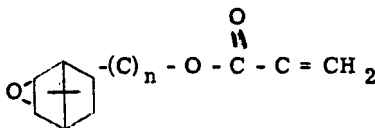
- (2) Note. Patents herein generally apply to those resins that are obtained by polymerizing mixtures of material containing coumarone and indene which have been obtained in coal-tar refining.

**268 From cyclic ether which is bridged or fused to a ring system:**

This subclass is indented under subclass 266. Subject matter wherein a bridged or fused ring monomer contains an oxygen atom adjoining two carbons in the same bridged or fused ring system, with the proviso that the adjoined carbon atoms are not double bonded to oxygen, selenium, or tellurium, e.g.,



, or



, etc.

- (1) Note. A bridged or fused ring system for purposes of this subclass requires that a ring system be attached at two different carbon atoms of its nuclear skeleton to an atom or chain of atoms which when taken together with the nuclear carbon atoms forms an additional ring structure.

SEE OR SEARCH THIS CLASS, SUBCLASS:

273, for an unsaturated compound containing an epoxy group.

**269 Hetero-oxygen ring compound contains a Carbonate group, i.e., -OO- as ring atoms:**

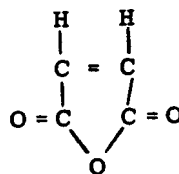
This subclass is indented under subclass 266. Subject matter wherein the unsaturated monomer has at least one heterocyclic ring which contains as ring atoms thereof a -OO- group (i.e., cyclic carbonate).

**270 5-membered heterocyclic ring compound contains at least one oxygen atom:**

This subclass is indented under subclass 266. Subject matter wherein an unsaturated monomer contains at least one hetero oxygen in a hetero ring containing five atoms.

**271 Acid anhydride:**

This subclass is indented under subclass 270. Subject matter wherein the 5-membered ring contains two carbonyl groups bonded to the same oxygen atom so as to form a hetero ring with the bonded oxygen atom, e.g.,

**272 Interpolymerized with hydrocarbon monomer:**

This subclass is indented under subclass 271. Subject matter wherein the 5-membered oxygen-containing ring is interpolymerized with at least one unsaturated monomer which is solely composed of hydrogen and carbon atoms.

- (1) Note. This subclass includes interpolymers and other interpolymers wherein other unsaturated monomers, in addition to a hydrocarbon monomer, are polymerized with the unsaturated heterocyclic oxygen-containing compound.

**273 3-membered heterocyclic ring contains at least one oxygen atom:**

This subclass is indented under subclass 266. Subject matter wherein the unsaturated monomer contains at least one hetero oxygen atom in a ring containing three atoms.

**274 From monomer containing a phosphorus atom:**

This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains at least one phosphorus atom.

**275 Phosphorus is part of a ring:**

This subclass is indented under subclass 274. Subject matter wherein the phosphorus atom is part of a ring system.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

258+, for an unsaturated monomer containing a nitrogen atom in a heterocyclic ring.

266+, for an unsaturated monomer containing an oxygen atom in a heterocyclic ring.

**276 Phosphorus is bonded to a nitrogen atom:**  
This subclass is indented under subclass 274. Subject matter wherein the phosphorus atom is covalently bonded to a nitrogen atom.

**277 Phosphorus atom is pentavalent:**  
This subclass is indented under subclass 274. Subject matter wherein a phosphorus atom has a valence of five.

**278 Pentavalent phosphorus is bonded to at least one atom of carbon:**  
This subclass is indented under subclass 277. Subject matter wherein a pentavalent phosphorus atom is directly bound to a carbon atom.

**279 From monomer containing a silicon atom:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains at least one silicon atom.

**280 From fused or bridged ring containing monomer:**  
This subclass is indented under subclass 72. Subject matter wherein a single carbocyclic ring is attached at two different carbon atoms of its nuclear skeleton to a methylene carbon atom, or substituted methylene group, or chain of methylene carbon atoms, or substituted methylene carbon atoms, which carbon atom or chain of carbon atoms when taken together with the attached nuclear carbon atoms of the carbocyclic ring forms an additional ring structure (e.g., polycyclic terpenes, etc.).

(1) Note. A bridged monomer for purposes of this subclass requires that two separate and discrete methylene groups, or substituted methylene groups, or chain of methylene carbon atoms, or substituted methylene carbon atoms be present in a molecule, one of said methylene groups or chain thereof being those nuclear carbon atoms between the two

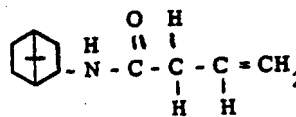
different attached carbon atoms of the original nuclear carbon atoms of the carbocyclic ring, and the second methylene group or chain thereof being those carbon atoms that are joined to the original nuclear carbon atoms of the carbocyclic ring so as to form the additional ring structure.

(2) Note. A fused ring monomer for purposes of this subclass requires a carbocyclic nucleus which is attached at two of its adjacent nuclear carbon atoms to a methylene group, or substituted methylene group, or to a chain of methylene carbon atoms, or a chain of substituted methylene carbon atoms, so that the adjoined carbon atoms form a carbocyclic ring which is in addition to the original carbocyclic ring.

**281 Bridged monomer:**  
This subclass is indented under subclass 280. Subject matter wherein the unsaturated monomer contains at least one bridged ring system.

**282 Contains an exterior ethylenic substituent bonded to a single carbon atom of the bridged ring system:**  
This subclass is indented under subclass 281. Subject matter wherein the bridged ring system contains at least one ethylenic group which is directly or indirectly bonded to a single carbon atom of the bridged ring nucleus.

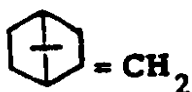
(1) Note. For purposes of this subclass "directly or indirectly bonded" is meant to include all ethylenic unsaturation which is external to the bridged nucleus and which is bonded to the bridged nucleus by a single nuclear carbon atom, e.g.,



, etc.

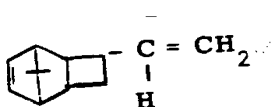
(2) Note. For purposes of this subclass, a methylene group which is bonded to a nuclear carbon atom will suffice as being

an external ethylenic group, and is proper for this subclass, e.g.,



SEE OR SEARCH THIS CLASS, SUBCLASS:

281+, for an ethylenic unsaturated group which is bonded to the bridged ring system through a ring which is fused to the bridged ring system, e.g.,



, etc.

**283 Compound containing dicyclopentadiene moiety:**

This subclass is indented under subclass 281. Subject matter wherein the bridged ring monomer is a dicyclopentadiene containing moiety.

- (1) Note. This subclass includes dicyclopentadiene, per se, as well as derivatives of dicyclopentadiene having at least the basic structure of dicyclopentadiene, shown below, available ethylenic bonds but wherein the hydrogen atoms of dicyclopentadiene may have been substituted by other atoms.



**284 Contains an exterior ethylenic substituent bonded directly or indirectly to a single carbon atom of the fused ring system:**

This subclass is indented under subclass 280. Subject matter wherein the fused ring system contains at least one ethylenic group to which is directly bonded to a single carbon atom of the fused ring nucleus.

- (1) Note. For purposes of this subclass, "directly or indirectly bonded" includes all ethylenic unsaturation which is external to the fused ring nucleus and which is bonded to the fused ring by a single nuclear carbon atom.

- (2) Note. For purposes of this subclass a methylene group which is bonded to a nuclear carbon atom will suffice as being an external ethylenic group.

**285 From monomer containing an acetylenic group:**

This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains at least one carbon to carbon triple bond.

**286 From S-containing monomer:**

This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains at least one sulfur atom.

**287 From monomer containing three or more oxygen atoms bonded to a single sulfur atom, e.g., sulfonate, etc.:**

This subclass is indented under subclass 286. Subject matter wherein the sulfur monomer contains at least one sulfur atom bonded to at least three oxygen atoms.

**288 From sulfur monomer containing nitrogen atom:**

This subclass is indented under subclass 286. Subject matter wherein the sulfur monomer contains at least one nitrogen atom.

**289 From sulfide-containing monomer:**

This subclass is indented under subclass 286. Subject matter wherein the sulfur monomer contains at least one sulfur atom as part of a sulfide group.

- (1) Note. A sulfide for purposes of this subclass denotes a class of compounds having a (S)<sub>n</sub> group, wherein n is 1 or more and wherein the carbon atoms bonded to the (S)<sub>n</sub> atoms are not double-bonded to oxygen, sulfur, selenium, or tellurium, or triple-bonded to nitrogen.

**290 Monomer from unsaturated petroleum hydrocarbon fraction; from unsaturated coal or bituminous material, extract, or derivative thereof; or from unsaturated fatty still residue:**

This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer is a mixture of hydrocarbons derived from a petroleum hydrocarbon fraction; or the unsaturated monomer is an unsaturated coal, bituminous material, extract or derivative thereof; or the unsaturated monomer is an unsaturated fatty still residue; or mixtures of said unsaturated monomers.

- (1) Note. This subclass includes polymers wherein added material is interpolymerized with a petroleum hydrocarbon fraction.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 76, for the combination of preparing a monomer by a chemical reaction involving a petroleum fraction and subsequent polymerization of said monomer.
- 267, for an interpolymer containing coumarone and indene.
- 280+, for a polymer prepared from a fused or bridged ring ethylenic unsaturated monomer.

**291 From halogen containing monomer having at least three carbon atoms:**

This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains at least one halogen atom and at least three carbon atoms.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 296, for an iodine or bromine-containing monomer, 1, 2-dichloroethylene, trichloroethylene, or tetrachloroethylene monomer.
- 343, for a polymer derived from vinylidene chloride.
- 344+, for a polymer derived from vinyl chloride.

**292.1 Halogen monomer is carboxylic acid ester:**

This subclass is indented under subclass 291. Subject matter wherein the halogen-containing monomer also contains a carboxylic acid ester group.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 291, and 293 through 295, for a halogen-containing monomer which also contains a carbonate group.

SEE OR SEARCH CLASS:

- 520, Synthetic Resins or Natural Rubbers, Glossary, under "carboxylic acid or derivative", see definition of "carboxylic acid ester".

**292.2 Contains nitrogen:**

This subclass is indented under subclass 292.1. Subject matter wherein said halogen-containing monomer also contains a nitrogen atom.

**292.3 Contains oxygen other than as part of a carboxylic acid ester group:**

This subclass is indented under subclass 292.1. Subject matter wherein said halogen-containing monomer also contains an oxygen atom other than as part of a carboxylic acid ester group.

- (1) Note. This subclass excludes halogenated carbonate monomers, per se; however, a halogen-containing monomer which contains a carboxylic acid ester moiety and a carbonate moiety would be included herein; as would a halogen-containing monomer which contains a carboxylic acid ester moiety and a free carboxylic acid moiety.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 291, 293 through 295, for a halogen-containing monomer which also contains a carbonate group.

**292.4 Contains two or more carboxylic acid ester groups:**

This subclass is indented under subclass 292.1. Subject matter wherein said halogen-containing monomer contains at least two carboxylic acid ester group.

**292.5 Contains carbocyclic ring, e.g., aryl, etc.:**  
This subclass is indented under subclass 292.1. Subject matter wherein said halogen-containing monomer contains a ring consisting solely of carbon atoms.

**292.6 Interpolymerized with a monomer containing atom other than carbon, hydrogen, or halogen:**  
This subclass is indented under subclass 292.1. Subject matter wherein said halogen-containing monomer is interpolymerized with an ethylenic monomer containing an atom other than carbon, hydrogen, or halogen.

**292.7 Interpolymerized:**  
This subclass is indented under subclass 292.1. Subject matter wherein said halogen-containing monomer is interpolymerized with another ethylenic monomer.

**292.8 Halogen monomer is nitrile:**  
This subclass is indented under subclass 291. Subject matter wherein the halogen-containing monomer contains a nitrile group.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, Glossary, under "carboxylic acid or derivative", see a definition of the term "nitrile".

**292.9 Halogen monomer contains an ether group:**  
This subclass is indented under subclass 291. Subject matter wherein the halogen-containing monomer contains an ether group, -C-O-C.

**292.95 Halogen monomer contains a carboxylic acid, salt, or carboxylic acid amide:**  
This subclass is indented under subclass 291. Subject matter wherein said halogen-containing monomer contains a free carboxylic acid, salt, or carboxylic acid amide group.

SEE OR SEARCH CLASS:

520, Synthetic Resins or Natural Rubbers, Glossary, under "carboxylic acid or derivative", see definitions of "carboxylic acid", "salt of a carboxylic acid", and "carboxylic acid amide".

**293 Aromatic:**  
This subclass is indented under subclass 291. Subject matter wherein the halogen-containing monomer contains at least one aromatic group therein.

**294 Plural halogen atom:**  
This subclass is indented under subclass 291. Subject matter wherein the halogen-containing monomer contains at least two halogen atoms therein.

(1) Note. The halogen atoms herein may be identical or different.

**295 Plural ethylenic groups:**  
This subclass is indented under subclass 291. Subject matter wherein the unsaturated monomer contains at least two separate ethylenic groups (e.g., halogenated butadiene, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:

249, for a polymer derived from a plural halogenated monomer containing at least one fluorine atom and at least one halogen atom which is other than fluorine.

**296 From bromine or iodine containing monomer, dichloroethylene, trichloroethylene or tetrachloroethylene:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains at least one atom of bromine or iodine or is 1, 2-dichloroethylene, trichloroethylene, or tetrachloroethylene.

**297 From nitrile group containing monomer other than acrylonitrile or methacrylonitrile:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains a nitrile group (i.e., R-CN) and wherein said nitrile compound is other than acrylonitrile, per se, or methacrylonitrile, per se.

SEE OR SEARCH THIS CLASS, SUBCLASS:

248, for a polymer derived from a monomer containing a fluorine atom and a nitrogen atom.

292.8, for a polymer derived from a monomer containing a nitrile group and a chlorine, iodine, or bromine atom.

341+, for a polymer derived from acrylonitrile or methacrylonitrile.

**298 Contains non-nitrile nitrogen atom or contains an oxygen atom:**

This subclass is indented under subclass 297. Subject matter wherein (1) the monomer contains at least two nitrogen atoms, one of said nitrogen atoms being part of a nitrile group, and the other nitrogen atom being in a nonnitrile form; or (2) the nitrile-containing monomer contains an oxygen atom chemically combined therein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

300, for a polymer derived from a monomer containing plural nitrile groups and no other nonnitrile nitrogen atom or no oxygen atom.

**299 Aromatic:**

This subclass is indented under subclass 297. Subject matter wherein the nitrile group-containing monomer has at least one aromatic group.

**300 Plural nitrile group-containing:**

This subclass is indented under subclass 297. Subject matter wherein the monomer contains at least two nitrile groups, e.g., vinylidene cyanide, etc.

**301 From monomer containing a NO- group, e.g., carbamic acid, etc.:**

This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains a NO- group (e.g., carbamates, etc.).

SEE OR SEARCH CLASS:

528, Synthetic Resins or Natural Rubbers, subclasses 367+ for a polymer derived from a reactant which contains a N group.

**302 From monomer containing a NN or NN group, e.g., urea, isourea, etc.:**

This subclass is indented under subclass 72. Subject matter wherein the unsaturated mono-

mer contains a NN group or N group, e.g., unsaturated ureas, etc.

SEE OR SEARCH CLASS:

528, Synthetic Resins or Natural Rubbers, subclasses 367+ for a polymer derived from a reactant which contains a - group.

**303.1 From carboxylic acid amide-containing monomer:**

This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains at least one carboxylic acid amide group, i.e., -CN or HN.

SEE OR SEARCH CLASS:

524, Synthetic Resins or Natural Rubbers, subclasses 29.1+ for a resin of the type found in this subclass but described as a composition (e.g., solution, dispersion, gel, emulsion, latex, etc.).

**304 Contains oxygen atom other than in amide form bonded to a carbon atom:**

This subclass is indented under subclass 303.1. Subject matter wherein the amide monomer contains at least one carbon atom bonded to at least one oxygen atom and wherein said carbon to oxygen bond is not part of an amide group.

(1) Note. Patents included within this subclass include those wherein two or more carbonyl groups are bonded to a nitrogen atom so as to form an imide group, e.g.,



, etc.

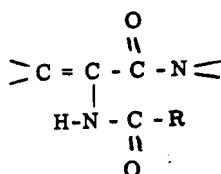
SEE OR SEARCH THIS CLASS, SUBCLASS:

306, for a polymer formed from a monomer containing plural amide groups and having no carbon-to-oxygen bond other than as an amide.



**305 Cycloaliphatic or aromatic:**  
This subclass is indented under subclass 303.1. Subject matter wherein the amide monomer contains a cycloaliphatic or aromatic group.

**306 Plural amide group containing:**  
This subclass is indented under subclass 303.1. Subject matter wherein the amide monomer contains at least two separate amide groups, e.g.,



**307 Non-amide nitrogen containing:**  
This subclass is indented under subclass 303.1. Subject matter wherein the amide monomer contains at least one additional nonamide group nitrogen atom.

**307.1 N-substituted unsaturated hydrocarbon group:**  
This subclass is indented under subclass 303.1. Subject matter wherein the carboxylic acid amide contains a N-substituted unsaturated hydrocarbon group (e.g., N-vinyl acetamide, N-allyl propionamide, etc.).

**307.2 With monomer containing carboxylic acid amide group:**  
This subclass is indented under subclass 303.1. Subject matter wherein the copolymer contains at least two carboxylic acid amide monomers (e.g., polymer from acrylamide and N, N-dimethylacrylamide, etc.).

**307.3 With monomer containing nitrogen other than (meth)acrylonitrile:**  
This subclass is indented under subclass 303.1. Subject matter wherein the copolymer is derived from a nitrogen-containing monomer other than (meth)acrylonitrile or a carboxylic acid amide (e.g., polymer from acrylamide and diethylaminoethyl methacrylate, etc.).

**307.4 With monomer containing oxygen:**  
This subclass is indented under subclass 303.1. Subject matter wherein the copolymer is derived from a comonomer containing oxygen (e.g., polymer from acrylamide and vinyl acetate, etc.).

**307.5 Oxygen atom is part of ether or hydroxyl group:**  
This subclass is indented under subclass 307.4. Subject matter wherein the copolymer is derived from a comonomer containing an ether or hydroxyl group (e.g., polymer from N, N-dimethylacrylamide and methyl vinyl ether; acrylamide and allyl alcohol, etc.).

**307.6 Oxygen atom is part of carboxylic acid group:**  
This subclass is indented under subclass 307.4. Subject matter wherein the copolymer is derived from a comonomer containing a carboxylic acid group (e.g., polymer from acrylamide and acrylic acid, etc.).

**307.7 Oxygen atom is part of ester group derived from unsaturated carboxylic acid:**  
This subclass is indented under subclass 307.4. Subject matter wherein the copolymer is derived from a monomer containing an ester group derived from a comonomer containing an ester group derived from an unsaturated carboxylic acid (e.g., a polymer from N-N-tertiary butylacrylamide and methyl acrylate, etc.).

**307.8 With hydrocarbon monomer:**  
This subclass is indented under subclass 303.1. Subject matter wherein the copolymer is derived from a hydrocarbon comonomer (e.g., polymer from acrylamide and ethylene, etc.).

**308 From cycloaliphatic monomer:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains a ring solely composed of carbon atoms, said ring of carbon atoms being nonaromatic.

- (1) Note. The ethylenic unsaturation may be part of the ring system or may be external to the ring system.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
280+, for a fused or bridged ring containing monomer.
- 309 Contains atoms other than carbon and hydrogen:**  
This subclass is indented under subclass 308. Subject matter wherein the ring-containing monomer contains at least one atom which is other than carbon and hydrogen.
- 310 From nitrogen containing monomer other than acrylonitrile or methacrylonitrile:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains at least one nitrogen atom and is other than acrylonitrile or methacrylonitrile, per se.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
341+, for a polymer derived from acrylonitrile or methacrylonitrile.
- 311 Nitrogen bonded to oxygen atom (including nitrogen containing salts):**  
This subclass is indented under subclass 310. Subject matter wherein the nitrogen monomer contains at least one bond between a nitrogen and an oxygen atom.
- 312 Contains oxygen atom bonded to a carbon atom:**  
This subclass is indented under subclass 310. Subject matter wherein the nitrogen monomer contains at least one bond between a carbon and an oxygen atom.
- 313 From phenol, phenol ether, or inorganic phenolate monomer:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer is a phenol, phenol ether, or inorganic salt of a phenol.
- SEE OR SEARCH CLASS:  
528, Synthetic Resins or Natural Rubbers, subclass 86, the Notes thereof, for a definition of the terms "phenol", phenol ether", and "an inorganic salt of a phenol (phenolate)".
- 314 From monomer containing a carbonate group, i.e., -OO-:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains a -OO- group, i.e., carbonates.
- SEE OR SEARCH CLASS:  
528, Synthetic Resins or Natural Rubbers, subclasses 370+ for a polymer derived from a -OO- containing reactant.
- 315 From aldehyde monomer:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains an aldehyde group.
- SEE OR SEARCH CLASS:  
520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the term "aldehyde".
- 316 From ketone or ketone monomer:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains a ketone or ketone group.
- (1) Note. A ketene requires a compound having the structure  $=C=O$ . Ketenes are considered as ketones herein.
- SEE OR SEARCH CLASS:  
520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the term "ketone".
- 317.1 Form carboxylic acid monomer:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer contains at least one free carboxyl group, i.e., OH.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
240+, for a polymer derived from an unsaturated carboxylic acid metal salt.  
292.1, for a halogen-containing carboxylic acid, salt or ester thereof.  
310+, for a nitrogen-containing salt of an unsaturated carboxylic acid.  
319+, for a polymer having carboxylic ester groups but devoid of a free carboxylic acid group.

930, through 940, for cross-reference art collections pertaining to the subject matter of this subclass and its indents.

**SEE OR SEARCH CLASS:**

525, Synthetic Resins or Natural Rubbers, subclass 329.1 for polyacrylic acid produced by oxidation of acrylonitrile and in appropriate subclasses 337-388 for the process oxidation of acrylonitrile; methacrylic acid produced by hydrolysis of polyalphahydroxy methacrylic acid ester.

**318 Block copolymer derived from vinyl(idene) chloride:**

This subclass is indented under subclass 317.1. Subject matter wherein the polymer is a block copolymer derived from vinyl chloride or vinylidene chloride.

(1) Note. To be proper for this subclass, the initial block copolymer must be derived from vinyl or vinylidene chloride.

**318.1 Carboxylic acid contains aryl group, or two or more ethylenic groups:**

This subclass is indented under subclass 317.1. Subject matter wherein the carboxylic acid monomer contains an aryl group or two or more ethylenic groups (e.g., cinnamic acid or sorbic acid, etc.).

**318.2 Carboxylic acid contains two or more carboxyl groups:**

This subclass is indented under subclass 317.1. Subject matter wherein the carboxylic acid monomer contains two or more free carboxyl groups (e.g., maleic acid, fumaric acid, etc.).

**318.25 With hydrocarbon, vinyl chloride or vinylidene chloride monomer:**

This subclass is indented under subclass 318.2. Subject matter wherein the monomer having two or more carboxyl groups is interpolymerized with an unsaturated hydrocarbon, vinyl chloride or vinylidene chloride or mixtures thereof.

**318.3 Carboxylic acid other than acrylic or methacrylic acid:**

This subclass is indented under subclass 317.1. Subject matter wherein the carboxylic acid monomer is other than acrylic or methacrylic acid.

**318.4 With hydrocarbon, vinyl chloride or vinylidene chloride monomer:**

This subclass is indented under subclass 318.2. Subject matter wherein the monomer having two or more carboxyl groups is interpolymerized with an unsaturated monomer which contains at least one carboxylic acid ester group.

**318.41 Monomer contains chalcogen other than C(=O)-O- (chalcogen in any monomer):**

This subclass is indented under subclass 318.4. Subject matter wherein at least one monomer contains chalcogen other than C(=O)-O-.

(1) Note. The chalcogen can be with either the ester monomer or another monomer.

**318.42 Hydroxyl group:**

This subclass is indented under subclass 318.4. Subject matter wherein the chalcogen is a hydroxyl group.

**318.43 Monomer contains two or more ester groups:**

This subclass is indented under subclass 318.4. Subject matter wherein the carboxylic acid monomer contains two more ester groups.

**318.44 Two or more ester monomers:**

This subclass is indented under subclass 318.4. Subject matter wherein the carboxylic acid monomer is interpolymerized with two or more carboxylic acid ester monomers.

**318.45 With hydrocarbon monomer:**

This subclass is indented under subclass 318.4. Subject matter wherein the carboxylic acid monomer is interpolymerized with an unsaturated carboxylic acid ester monomer and an unsaturated hydrocarbon monomer.

**318.5 With chalcogen containing monomer, e.g., additional carboxyl monomer, etc.:**

This subclass is indented under subclass 317.1. Subject matter wherein the carboxylic acid monomer is interpolymerized with an additional carboxylic acid monomer, etc.

**318.6 With hydrocarbon monomer:**

This subclass is indented under subclass 317.1. Subject matter wherein the carboxylic acid monomer is interpolymerized with an unsaturated hydrocarbon monomer.

**319 From carboxylic acid ester monomer:**  
This subclass is indented under subclass 72. Subject matter wherein an unsaturated monomer contains at least one carboxylic acid ester group.

- (1) Note. This subclass does not require that an ester be prepared from the reaction of an acid and an alcohol. It is sufficient if the ester compound be identical in structure to a compound prepared by the replacement of a hydroxyl group by a carboxylic acid radical. Each carboxylic acid ester, no matter how prepared, is to be regarded as being the reaction product of a carboxylic acid and a replaceable hydroxyl group.

**SEE OR SEARCH CLASS:**

520, Synthetic Resins or Natural Rubbers, Glossary, for a definition of the term "carboxylic acid or derivative" which includes a definition of "carboxylic acid ester".

**320 Ether or hydroxy containing:**  
This subclass is indented under subclass 319. Subject matter wherein in addition to the carboxylic acid ester group there is also present in the molecule at least one ether or alcohol group.

**321 Monomer containing at least two carboxylic acid ester groups:**  
This subclass is indented under subclass 319. Subject matter wherein the ester is derived from at least one carboxylic acid which contains plural carboxylic acid groups.

**322 Derived from an ethylenically unsaturated alcohol:**  
This subclass is indented under subclass 321. Subject matter wherein at least one of the alcohol moieties of the ester compound is ethylenically unsaturated (e.g., diallyl phthalate, etc.).

**323 Derived from an ethylenically unsaturated acid containing plural carboxylic acid groups:**  
This subclass is indented under subclass 322. Subject matter wherein the plural carboxylic acid group compound contains ethylenic unsaturation.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

327, for an ester of a monocarboxylic acid wherein both the carboxylic acid and the esterifying alcohol are ethylenically unsaturated.

**323.1 Diester derived from an ethylenically unsaturated monocarboxylic acid and polyol:**

This subclass is indented under subclass 321. Subject matter wherein a diester derived from an ethylenically unsaturated monocarboxylic acid and a polyol is polymerized.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

327, for an ester derived from an ethylenically unsaturated carboxylic and an ethylenically unsaturated alcohol.

328, for an ester derived from an ethylenically unsaturated carboxylic acid.

**323.2 With additional monomer:**

This subclass is indented under subclass 323.1. Subject matter wherein the diester is interpolymerized with at least one monomer which is ethylenically unsaturated.

**324 Interpolymerized with hydrocarbon monomer:**

This subclass is indented under subclass 321. Subject matter wherein a polycarboxylic acid ester is interpolymerized with at least one monomer which is a diverse ethylenically unsaturated hydrocarbon.

**325 Interpolymerized with monomer of diverse carboxylic ester:**

This subclass is indented under subclass 321. Subject matter wherein a polycarboxylic acid ester is interpolymerized with at least one monomer which is a diverse ethylenically unsaturated carboxylic acid ester.

**326 Aromatic:**

This subclass is indented under subclass 319. Subject matter wherein the unsaturated ester contains at least one aromatic ring.

- 327 Derived from an ethylenically unsaturated carboxylic acid and an ethylenically unsaturated alcohol:**  
This subclass is indented under subclass 319. Subject matter wherein the ester contains ethylenic unsaturation in the carboxylic acid group as well as in the alcohol group.
- 328 Derived from an ethylenically unsaturated carboxylic acid:**  
This subclass is indented under subclass 319. Subject matter wherein the ester is derived from a saturated alcohol and an unsaturated carboxylic acid.
- 328.5 With additional monomer:**  
This subclass is indented under subclass 328. Subject matter wherein the unsaturated carboxylic acid ester monomer is interpolymerized with at least one monomer which is ethylenically unsaturated.
- 329 Interpolymerized with hydrocarbon monomer:**  
This subclass is indented under subclass 328.5. Subject matter wherein the unsaturated carboxylic acid ester monomer is interpolymerized with at least one monomer which is an ethylenically unsaturated hydrocarbon.
- 329.1 Hydrocarbon monomer containing at least two ethylenic groups, e.g., butadiene, etc.:**  
This subclass is indented under subclass 329. Subject matter wherein the hydrocarbon monomer contains at least two ethylenic groups.
- 329.2 Aromatic, e.g., styrene, etc.:**  
This subclass is indented under subclass 329. Subject matter wherein the hydrocarbon monomer contains an aryl ring.
- 329.3 With acrylonitrile or methacrylonitrile:**  
This subclass is indented under subclass 328.5. Subject matter wherein acrylonitrile or methacrylonitrile is interpolymerized with an ester derived from an ethylenically unsaturated carboxylic acid.
- 329.4 With halogen-containing monomer:**  
This subclass is indented under subclass 328.5. Subject matter wherein an ethylenically unsaturated halogen-containing monomer is interpolymerized with an ester derived from an ethylenically unsaturated carboxylic acid.
- 329.5 With ester derived from saturated carboxylic acid:**  
This subclass is indented under subclass 328.5. Subject matter wherein an ethylenically unsaturated ester derived from a saturated carboxylic acid is interpolymerized with an ester derived from an ethylenically unsaturated carboxylic acid.
- 329.6 With monomer-containing ether group:**  
This subclass is indented under subclass 328.5. Subject matter wherein an ethylenically unsaturated ether is interpolymerized with an ester derived from an ethylenically unsaturated carboxylic acid.
- 329.7 Polymer derived from methyl acrylate or methyl methacrylate:**  
This subclass is indented under subclass 328. Subject matter wherein methyl acrylate or methyl methacrylate is polymerized.
- 330 Interpolymer of an ester derived from ethylenically unsaturated alcohol, e.g., interpolymer of vinyl acetate, etc.:**  
This subclass is indented under subclass 319. Subject matter drawn to interpolymers derived from at least one ester having unsaturation in the alcohol portion and which is devoid of unsaturation in the carboxylic acid portion.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
319, for a homopolymer of an ester derived from an unsaturated alcohol and a saturated carboxylic acid.
- 331 Interpolymerized with hydrocarbon monomer:**  
This subclass is indented under subclass 330. Subject matter wherein the unsaturated ester is interpolymerized with at least one monomer which is an ethylenically unsaturated hydrocarbon.

- 332 From monomer containing an ether group:**  
This subclass is indented under subclass 72. Subject matter wherein an unsaturated monomer contains at least one ether function.
- 333 Plural ether groups:**  
This subclass is indented under subclass 332. Subject matter wherein the unsaturated monomer contains at least two ether groups.
- 334 Aromatic or plural ethylenic groups:**  
This subclass is indented under subclass 332. Subject matter wherein the unsaturated monomer contains (1) at least one aromatic group; or (2) at least two ethylenically unsaturated groups.
- 335 From hydrocarbon monomer containing at least two ethylenic groups, e.g., butadiene, etc.:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer is a hydrocarbon compound which contains at least two ethylenically unsaturated groups.
- 336 Ethylenic groups are non-conjugated, e.g., divinylbenzene, etc.:**  
This subclass is indented under subclass 335. Subject matter wherein two or more ethylenically unsaturated groups are (1) separated from each other either by an aromatic ring (e.g., divinyl benzene), or (2) separated by at least one carbon atom of an acyclic carbon chain which carbon atom is not part of a methine group (e.g.,  $-C=C-C-C=C-$ , etc.), or (3) wherein two ethylenically unsaturated groups share a single carbon atom (e.g.,  $C=C=C$ , etc.).
- 337 Interpolymerized with at least one diverse hydrocarbon monomer containing at least two ethylenic groups:**  
This subclass is indented under subclass 335. Subject matter which involves the interpolymerization of at least two hydrocarbon monomers each of which contains two or more conjugated ethylenic bonds.
- 338 Interpolymerized with non-hydrocarbon monomer:**  
This subclass is indented under subclass 335. Subject matter which involves the interpolymerization of a hydrocarbon monomer containing two or more conjugated ethylenic bonds with at least one ethylenic monomer which is not a hydrocarbon.
- 339 Interpolymerized with aliphatic hydrocarbon:**  
This subclass is indented under subclass 335. Subject matter which involves the interpolymerization of a hydrocarbon monomer containing two or more conjugated ethylenic bonds with at least one nonaromatic ethylenic monomer.
- 340 Interpolymerized with aromatic hydrocarbon:**  
This subclass is indented under subclass 335. Subject matter which involves the interpolymerization of a hydrocarbon monomer containing two or more conjugated ethylenic bonds with at least one aromatic ethylenic monomer.
- 340.1 Polymerized in the presence of a water medium:**  
This subclass is indented under subclass 335. Subject matter wherein a hydrocarbon monomer containing two or more ethylenic groups is polymerized under conditions wherein an aqueous medium (water) is employed in the process or products which are the result of such a polymerization process.
- (1) Note. This subclass is intended to take those processes or products thereof, wherein a significant amount of water is employed (emulsion, suspension, etc.) rather than where mere trace amounts of water are utilized (e.g., ppm H<sub>2</sub>O, etc.).
- 340.2 From hydrocarbon having only five carbon atoms:**  
This subclass is indented under subclass 335. Subject matter wherein the hydrocarbon monomer contains only five carbon atoms (e.g., 1, 3-pentadiene, etc.).
- 340.3 From hydrocarbon having at least six carbon atoms:**  
This subclass is indented under subclass 335. Subject matter wherein the hydrocarbon monomer contains six or more carbon atoms (e.g., 2-methyl-1, 3-pentadiene, etc.).

- 340.4 Butadiene homopolymer contains at least 75 percent cis-1, 4-configuration:**  
This subclass is indented under subclass 335. Subject matter wherein polybutadiene formed contains at least 75 percent cis-configuration.
- (1) Note. Polymers produced with Group VIII transition metal catalysts are presumed to have 75 percent cis-1, 4-configuration in the absence of any disclosure to the contrary.
- 341 From acrylonitrile or methacrylonitrile:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer is acrylonitrile or methacrylonitrile.
- 342 Interpolymerized:**  
This subclass is indented under subclass 341. Subject matter which involves the interpolymerization of acrylonitrile or methacrylonitrile with each other or with other ethylenically unsaturated monomers.
- 343 From vinylidene chloride:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer is vinylidene chloride.
- 344 From vinyl chloride:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer is vinyl chloride.
- 344.1 Bulk or mass polymerization of vinyl chloride only:**  
This subclass is indented under subclass 344. Subject matter wherein vinyl chloride only is polymerized under so-called mass or bulk, also known as block or cast polymerization conditions, and wherein the process does not involve the use of a solvent or dispersing medium, and products which are the result of such a polymerization process.
- (1) Note. Appropriate for this subclass are processes wherein the monomer or polymer produced act as solvents.
- 344.2 Polymerization of vinyl chloride only in an aqueous medium:**  
This subclass is indented under subclass 344. Subject matter wherein vinyl chloride only is polymerized under conditions wherein an aqueous medium (water) is employed in the process and products which are the result of such polymerization process.
- (1) Note. This subclass is intended to take those processes and products wherein a significant amount of water is employed (emulsion, suspension, etc.) rather than where mere trace amounts of water are utilized (e.g. ppm H<sub>2</sub>O, etc.).
- 344.3 Polyvinyl chloride characterized by physical shape, e.g., fiber, sheet, etc.:**  
This subclass is indented under subclass 344. Subject matter wherein polyvinyl chloride homopolymer is characterized by mere physical structure such as fiber, sheet, granular, or the like.
- SEE OR SEARCH CLASS:  
428, Stock Material or Miscellaneous Articles, for polyvinyl chloride material characterized by physical structure wherein at least one physical dimension is recited.
- 345 Interpolymerized:**  
This subclass is indented under subclass 344. Subject matter which involves the interpolymerization of vinyl chloride with at least one ethylenically unsaturated monomer.
- 346 From aromatic hydrocarbon:**  
This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer is a compound having at least one aromatic group and only carbon and hydrogen atoms.
- 347 Interpolymerized:**  
This subclass is indented under subclass 346. Subject matter wherein an ethylenically unsaturated hydrocarbon monomer having at least one aromatic group is interpolymerized with at least one ethylenically unsaturated monomer.

**347.1 Monomer other than styrene:**

This subclass is indented under subclass 346. Subject matter wherein the aromatic hydrocarbon contains more than eight carbon atoms.

**347.2 Crystalline polystyrene:**

This subclass is indented under subclass 346. Subject matter drawn to crystalline polystyrene:

- (1) Note. All polymers prepared in the presence of a transition-metal atom and in the substantial absence of water are included herein unless the disclosure indicates to the contrary that a noncrystalline polymer is formed.
- (2) Note. All polymers prepared in the presence of a free-radical catalyst or redox catalyst are excluded herein unless the disclosure indicates that a crystalline polymer is formed.
- (3) Note. Any degree of crystalline or isotactic content is sufficient for this subclass.

**348 From hydrocarbon:**

This subclass is indented under subclass 72. Subject matter wherein the unsaturated monomer is a compound having only carbon and hydrogen atoms.

**348.1 Stretched product:**

This subclass is indented under subclass 348. Subject matter wherein the polymeric product has been physically stretched so as to alter physical properties, e.g., biaxially stretched polyethylene, etc.

**348.2 At least six carbon atoms:**

This subclass is indented under subclass 348. Subject matter wherein the hydrocarbon monomer contains at least six carbon atoms.

**348.3 Ten or more carbon atoms:**

This subclass is indented under subclass 348.2. Subject matter wherein the hydrocarbon monomer contains ten or more carbon atoms.

**348.4 Six carbon atoms only:**

This subclass is indented under subclass 348.2. Subject matter wherein the hydrocarbon monomer contains only six carbon atoms.

**348.5 N-hexene:**

This subclass is indented under subclass 348.4. Subject matter wherein the hydrocarbon-monomer is n-hexene (i.e., straight-chain hexene).

**348.6 At least four carbon atoms:**

This subclass is indented under subclass 348. Subject matter wherein the hydrocarbon monomer contains at least four carbon atoms.

**348.7 Isobutylene:**

This subclass is indented under subclass 348.6. Subject matter wherein the hydrocarbon monomer is isobutylene.

**348.8 With nonhydrocarbon monomer:**

This subclass is indented under subclass 348. Subject matter wherein the hydrocarbon monomer, is interpolymerized with a nonhydrocarbon monomer (e.g., ethylene-allyl alcohol copolymer, etc.).

**351 From propylene only:**

This subclass is indented under subclass 348. Subject matter wherein the unsaturated monomer is only propylene.

**352 From ethylene only:**

This subclass is indented under subclass 348. Subject matter wherein the unsaturated monomer is only ethylene.

**352.2 Low density:**

This subclass is indented under subclass 352. Subject matter wherein the density of the formed polymer is less than or equal to 0.935.

- (1) Note. The term density refers to density as measured by ASTM D 1505 or specific gravity and is not to be confused with terms such as "apparent density" or "bulk density".
- (2) Note. In the absence of a specific disclosure of density, all polymers produced by a free radical-yielding catalyst (e.g., peroxy, azo, or redox, etc.) are presumed to be low density and proper herein.



## CROSS-REFERENCE ART COLLECTIONS

The following subclasses are collections of published disclosure pertaining to various aspects of art relating to synthetic resins which are derived from ethylenic monomers, and which aspects do not form an appropriate base for subclass classification in the classification schedule. Note: SPECIAL CROSS-REFERENCE ART COLLECTIONS: Subclasses (930-940) relate only to the subject matter of subclasses 317.1+ (excluding 318).

- (1) Note. Disclosures are placed for value as a search aid and in no instance do they represent the entire extent of the prior art.

**901 MONOMER POLYMERIZED IN VAPOR STATE IN PRESENCE OF TRANSITION METAL CONTAINING CATALYST:**

Processes of polymerizing a vaporized ethylenically unsaturated monomer utilizing a catalyst having at least one transition metal atom.

SEE OR SEARCH THIS CLASS, SUBCLASS:

913, for processes of polymerizing a vaporized monomer absent a transition metal catalyst.

**902 MONOMER POLYMERIZED IN BULK IN PRESENCE OF TRANSITION METAL CONTAINING CATALYST:**

Processes of polymerizing an ethylenically unsaturated monomer in bulk form utilizing a catalyst having at least one transition metal atom.

**903 MONOMER POLYMERIZED IN PRESENCE OF TRANSITION METAL CONTAINING CATALYST AND HYDROCARBON ADDITIVE AFFECTING POLYMER PROPERTIES OF CATALYST ACTIVITY:**

Processes of polymerizing an ethylenically unsaturated monomer in the presence of a catalyst containing a transition metal atom, and in the presence of a hydrocarbon additive, which additive affects the final properties of the produced polymer or which affects the activity of the catalyst.

**904 MONOMER POLYMERIZED IN PRESENCE OF TRANSITION METAL CON-**

**TAINING CATALYST AT LEAST PART OF WHICH IS SUPPORTED ON A POLYMER; E.G., PREPOLYMERIZED CATALYSTS, ETC.:**

Processes of polymerizing an ethylenically unsaturated monomer in the presence of a catalyst contains a transition metal, which transition metal is carried on a polymer support.

**905 POLYMERIZATION IN PRESENCE OF TRANSITION METAL CONTAINING CATALYST IN PRESENCE OF HYDROGEN:**

Processes of polymerizing an ethylenically unsaturated monomer in the presence of elemental hydrogen and a catalyst containing a transition metal.

**906 COMMINATION OF TRANSITION METAL CONTAINING CATALYST:**

Processes of polymerizing an ethylenically unsaturated monomer in the presence of a catalyst containing a transition metal, which transition metal catalyst has been comminuted.

**907 SPECIFIED MEANS OF REACTING COMPONENTS OF TRANSITION METAL CATALYST:**

Processes of polymerizing an ethylenically unsaturated monomer utilizing a catalyst system containing a transition metal wherein the catalyst system has been prepared by the reacting of individual components thereof in a specified manner.

**908 CONTAINING CATALYST OF SPECIFIED PARTICLE SIZE:**

Processes of polymerizing ethylenically unsaturated monomers wherein the catalyst utilized has a particular particle size.

**909 POLYMERIZATION CHARACTERIZED BY PARTICLE SIZE OF PRODUCT:**

Processes of polymerizing an ethylenically unsaturated monomer wherein the polymerized product is distinguished by a particular particle size.

**910 SUSPENDING AGENTS:**

Processes of polymerizing an ethylenically unsaturated monomer wherein a particular suspending agent is utilized in the polymerization process.

- 911 EMULSIFYING AGENTS:**  
Processes of polymerizing an ethylenically unsaturated monomer wherein a particular emulsifying agent is utilized in the polymerization process.
- 912 REACTION MEDIUM PURIFICATION:**  
Processes of polymerizing an ethylenically unsaturated monomer wherein the reaction medium is purified prior to its utilization.
- 913 VAPOR PHASE POLYMERIZATION IN ABSENCE OF TRANSITION METAL CONTAINING CATALYST:**  
Processes of polymerizing an ethylenically unsaturated monomer in the vapor state.
- 914 POLYMER DEGRADATION:**  
Processes involving the degradation of a polymer derived from at least one ethylenic unsaturated monomer.
- 915 REDOX CATALYST:**  
Processes of polymerizing an ethylenically unsaturated monomer utilizing a redox-type catalyst system.
- 916 INTERPOLYMER FROM AT LEAST THREE ETHYLENICALLY UNSATURATED MONOOLEFINIC HYDROCARBON MONOMERS:**  
Subject matter involving an interpolymer derived from at least three ethylenically unsaturated mono-olefinic hydrocarbon monomers.
- 917 MANIPULATIVE PROCESSES INVOLVING A SULFUR-CONTAINING TREATING AGENT:**  
Manipulative processes of treating a polymer derived from only ethylenic monomers with a sulfur-containing treating agent.
- 918 POLYMERIZATION REACTORS FOR ADDITION POLYMER PREPARATION:**  
Subject matter involving polymerization reactor apparatus specialized for ethylenic monomers.
- 919 CATALYST INJECTION TECHNIQUE IN ADDITION POLYMERIZATION PROCESSES:**  
Subject matter involving ethylenic polymerization processes wherein a particular technique
- or injecting catalyst into the reactor is involved, e.g., into a carrier gas, sparged into monomer stream, use of a particular pump, etc.
- 920 APPARATUS FOR USE IN ADDITION POLYMERIZATION PROCESSES:**  
Subject matter involving apparatus other than reactors specialized for use in polymerization processes (e.g., monomer mixing apparatus, catalyst, pre-treaters, etc.).
- 921 TIME CYCLE USED IN ADDITION POLYMERIZATION PROCESS CONTROL:**  
Processes of polymerizing an ethylenically unsaturated monomer wherein the polymerization process is controlled as a function of time.
- 922 POLYMERIZATION PROCESS OF ETHYLENIC MONOMERS USING MANIPULATIVE TECHNIQUE:**  
Processes of polymerizing an ethylenically unsaturated monomer involving manipulative procedures.
- 923 ETHYLENIC MONOMERS CONTAINING AT LEAST ONE SALT GROUP:**  
Subject matter involving polymers derived from salt-containing monomers.
- 930 WATER SWELLABLE OR HYDROPHILIC:**  
Subject matter relating to water swellable or hydrophilic polymers derived from ethylenically unsaturated carboxylic acids.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
317.1, and 318.1-318.5, for the subclasses within the class hierarchy to which this cross-reference art collection pertains.
- 931 PRESSURE SENSITIVE ADHESIVE:**  
Subject matter relating to polymers derived from ethylenically unsaturated carboxylic acids and having utility in pressure sensitive adhesive formulation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
317.1, and 318.1-318.5, for the subclasses within the class hierarchy to which

this cross-reference art collection pertains.

**932 THICKENER OR DISPERSANT FOR AQUEOUS SYSTEM:**

Subject matter relating to polymers derived from ethylenically unsaturated carboxylic acid and having utility as a thickener or dispersant for aqueous systems.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

317.1, and 318.1-318.5, for the subclasses within the class hierarchy to which this cross-reference art collection pertains.

**933 DETERGENT PROPERTY OR LUBRICANT ADDITIVE:**

Subject matter relating to polymers derived from ethylenically unsaturated carboxylic acid and having detergent properties or utility as a lubricant additive.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

317.1, and 318.1-318.5, for the subclasses within the class hierarchy to which this cross-reference art collection pertains.

**934 ELECTRODEPOSIT, E.G., ELECTROPHORETIC, XEROGRAPHIC, ETC.:**

Subject matter relating to polymers derived from ethylenically unsaturated carboxylic acid and having utility in a deposition process of using electrical energy.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

317.1, and 318.1-318.5, for the subclasses within the class hierarchy to which this cross-reference art collection pertains.

**935 HOT MELT ADHESIVE:**

Subject matter relating to polymers derived from ethylenically unsaturated carboxylic acid and having utility in a hot melt adhesive formulation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

317.1, and 318.1-318.5, for the subclasses within the class hierarchy to which this cross-reference art collection pertains.

**936 PHYSIOLOGICAL USE, E.G., PHARMACEUTICAL, VETERINARY, DENTAL, ETC.:**

Subject matter involving polymers from ethylenically unsaturated carboxylic acid and disclosed as suitable for a physiological use.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

317.1, and 318.1-318.5, for the subclasses within the class hierarchy to which this cross-reference art collection pertains.

**937 OPTICAL CLARITY:**

Subject matter involving polymers from ethylenically unsaturated carboxylic acid having property of optical clarity.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

317.1, and 318.1-318.5, for the subclasses within the class hierarchy to which this cross-reference art collection pertains.

**938 RUBBERY PROPERTY:**

Subject matter involving polymers from ethylenically unsaturated carboxylic acid and having rubbery or elastomeric property.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

317.1, and 318.1-318.5, for the subclasses within the class hierarchy to which this cross-reference art collection pertains.

**939 MOISTURE PROOF OR HYDROPHOBIC:**

Subject matter involving polymers from ethylenically unsaturated carboxylic acid and having moisture proof or hydrophobic property.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

317.1, and 318.1-318.5, for the subclasses within the class hierarchy to which this cross-reference art collection pertains.

**940 HIGH SOFTENING TEMPERATURE, E.G., EXPOSURE TO BOILING WATER, BOILABLE, ETC.:**

Subject matter involving polymers from ethylenically unsaturated carboxylic acid and having the property of high softening temperature.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

317.1, and 318.1-318.5, for the subclasses within the class hierarchy to which this cross-reference art collection pertains.

**941 HAVING THE TRANSITION METAL BONDED DIRECTLY TO CARBON:**

Subject matter involving specified materials wherein carbon is bonded directly to the

SEE OR SEARCH THIS CLASS, SUB-CLASS:

124.2, through 125.8, for the subclasses within the class hierarchy to which the cross-reference art collection pertains.

**942 POLYMERIZATION IN THE PRESENCE OF A LIQUID CO<sub>2</sub> DILUENT:**

Process of using liquid phase carbon dioxide as diluent in a polymerization reaction.

**943 POLYMERIZATION WITH METALLOCENE CATALYST:**

Process of polymerization in the presence of metallocene catalyst.

- (1) Note. Metallocene is defined as an organometallic coordination compound which is a cyclopentadienyl derivative of a transition metal or metal halide. Included are substituted cyclopentadienyl moieties.

END