CLASS 850, SCANNING-PROBE TECHNIQUES OR APPARATUS; APPLICATIONS OF SCANNING-PROBE TECHNIQUES, E.G., SCANNING-PROBE MICROSCOPY [SPM]

SECTION I - CLASS DEFINITION

This class covers Scanning probes, i.e., devices having at least a tip of nanometre sized dimensions that scans or moves over an object surface, typically at a distance of a few angstroms or nanometres, monitoring some interaction between the tip and the surface, e.g., monitoring the generation of a tunnelling current and techniques or apparatus involving the use of scanning probes.

The following subjects are therefore covered, the list being non-exhaustive:

scanning probes, per se, their manufacture or their related instrumentation, e.g., holders;

scanning probe microscopy (SPM) or microscopes, i.e., the application of scanning probes to the investigation or analysis of a surface structure in atomic ranges;

applications, other than SPM, involving the use of scanning probes.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

Class 73,Measuring and Testing, is the generic class for processes and apparatus for making a measurement of any kind or for making a test of any kind. It takes all such subject matter not provided for in other classes. Claimed subject matter directed to a specific structure or method of SPM is classifiable in Class 850. Class324, Electricity: Measuring and Testing, is the residual home for all subject matter, not elsewhere classified, relating to the measuring, testing or sensing of electric properties. Claimed subject matter directed to a specific structure or method of SPM is classifiable Class 850.

SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS

SEE OR SEARCH THIS CLASS, SUBCLASS:

1 through 4, for details of arrangements for operator to control the movement or position of the probe.

5 through 7, for monitoring the movement or position of the probe by means built in the probe device responsive to an interaction with the sample.

21 through 51, for particular type of scanning probe microscope (SPM) and manufacture thereof.

52 through 61, for aspects of SPM probes and their manufacture in general.

62, for application of SPM other than analyzing surface sample.

SECTION IV - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclass 104, 105 for testing or inspecting surfaces or edges in general and subclass 866 for the testing of material not elsewhere classifiable.

216, Etching a Substrate: Processes, appropriate subclasses for surface etching processing using SPM.

250, Radiant Energy, subclasses 306 through 443.1 apparatus and methods for the inspection of solids or liquids in which charged particles, impelled (as in a beam) toward the object to be inspected and pass near to or through the object, or are reflected from or diffracted by the object, or secondary radiations emitted from the object, are detected.

324, Electricity: Measuring and Testing, subclass 72.5 for testing potential in specific environments using a voltage probe; subclasses 76.11-157 for measuring, testing, or sensing electricity, per se, using probes; subclasses 307-315 for means to measure the effects of external magnetic fields upon the resonance of a host material in a controlled electromagnetic field; subclasses 425-450 for using probes to test electrolytes; subclasses 500-556 for fault detecting in electric circuits and of electric components using probes, and subclasses 600-727 for testing impedance, admittance or other quantities representative of electrical stimulus/ response relationships using probes, especially subclass 690 for capacitance sensing using probes.

360, Dynamic magnetic Information Storage or Retrieval, appropriate subclasses for information recording using SPM in accordance with means for recording.

369, Dynamic Information Storage or Retrieval, appropriate subclasses for information record-

ing using SPM in accordance with means for recording.

427, Coating Process, appropriate subclasses for surface coating processing using SPM; especially subclasses 357 through 601 for coating processes with direct application of electrical, magnetic, wave, or particular energy using SPM.

720, Dynamic Optical Information Storage or Retrieval, appropriate subclasses for information recording using SPM in accordance with means for recording for processes and apparatus for making a measurement of any kind or for making a test of any kind, and takes all such subject matter not provided for in other classes.

977, Nanotechnology, subclasses 849 through 881 for subject matter appropriately crossed into this cross reference art collection.

SUBCLASSES

1 SCANNING OR POSITIONING ARRANGEMENTS, I.E., ARRANGEMENTS FOR ACTIVELY CONTROLLING THE MOVEMENT OR POSITION OF THE PROBE (EPO):

This subclass is indented under the class definition. Subject matter includes details about means or methods for actively controlling the movement or the location of the scanning probe tip relative to the object surface.

(1) Note. This subclass and its indents are directed to arrangements for an operator to control the movement or position of the probe.

(2) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 10/00).

SEE OR SEARCH THIS CLASS, SUBCLASS:

5, for means to monitor movements of the probe caused by a response of the probe to an interaction with the sample.

2 Coarse scanning or positioning (EPO):

This subclass is indented under subclass 1. Subject including generating movement of the scanning probe tip relative to the object surface at a scale larger than the resolution of the scanning probe microscope.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 10/02).

3 Fine scanning or positioning (EPO):

This subclass is indented under subclass 1. Subject matter including generating movement of the scanning probe tip relative to the object surface as large as the scale of the resolution of the scanning probe microscope.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 10/04).

4 Circuits or algorithms therefor (EPO):

This subclass is indented under subclass 3. Subject matter including electronic means for locating or stabilizing the movement of the scanning probe tip relative to the object surface.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 10/06).

5 MONITORING THE MOVEMENT OR POSITION OF THE PROBE RESPONSIVE TO INTERACTION WITH THE SAMPLE (EPO):

This subclass is indented under the class definition. Subject matter including a method or apparatus used to monitor the movement of the probe.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 20/00).

SEE OR SEARCH THIS CLASS, SUBCLASS:

1, for arrangements for an operator to control the movement or position of the probe.

6 By optical means (EPO):

This subclass is indented under subclass 5. Subject matter wherein the monitoring involves the use of a light-sensitive/responsive device.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 20/02).

SEE OR SEARCH CLASS:

359, Optical: Systems and Elements, subclasses 15 through 20 for optical device in which a hologram is used to direct a beam of light over the elements of a given region; subclasses 201-208 for optical scanning.

7 Self-detecting probes (EPO):

This subclass is indented under subclass 5. Subject matter wherein the probe comprises in their structure means for detecting a signal to control/monitor its movements (e.g., piezoelectric gauge).

(1) Note: An example for Self-detecting probe is the probe itself generates a signal representative of its position, e.g., piezo-electric gauge.

(2) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 20/04).

8 AUXILIARY MEANS SERVING TO ASSIST OR IMPROVE THE SCANNING PROBE TECHNIQUES OR APPARATUS, E.G., DISPLAY OR DATA PROCESSING DEVICES (EPO):

This subclass is indented under the class definition. Subject matter including a additional device or method that assists or improves the analysis or the investigation.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 30/00).

9 Non-SPM analysing devices, e.g., Scanning Electron Microscope [SEM], spectrometer or optical microscope (EPO):

This subclass is indented under subclass 8. Subject matter wherein the additional device is an analysing or investigating device different from a scanning probe microscope.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 30/02).

SEE OR SEARCH CLASS:

250, Radiant Energy, subclasses 306 through 311 for analysing device which impels charged particles toward a object or material to be studied; subclass 310 for scanning electron microscope.

359, Optical: Systems and Elements, subclasses 368 through 398 for optical microscopes, per se.

10 Display or data processing devices (EPO):

This subclass is indented under subclass 8. Subject matter including a programmable device that stores, retrieves, processes or displays data for assisting or improving the scanning probe technique or apparatus.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 30/04).

SEE OR SEARCH CLASS:

345, Computer Graphics Processing and Selective Visual Display Systems, for appropriate subclasses.

11 For error compensation (EPO):

This subclass is indented under subclass 10. Subject matter wherein the data information is used to correct or fix the performance of the SPM.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 30/06).

12 Means for establishing or regulating a desired environmental condition within a sample chamber (EPO):

This subclass is indented under subclass 8. Subject matter including means that can adjust or control the parameters, such as temperature, pressure, humidity, etc., of a working environment condition inside the chamber containing the sample being studied.

(1) Note. included in this subclass is means for actively establishing desired environmental within the sample chamber such as by heating the chamber to an elevated temperature, filling the chamber with a liquid, or other such means.

(2) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 30/08).

SEE OR SEARCH THIS CLASS, SUBCLASS:

17, for means for preventing undesired external phenomena such as breezes, vibrations from people walking nearby, etc., from having any effect on conditions within the sample chamber.

13 Thermal environment (EPO):

This subclass is indented under subclass 12. Subject matter including means to adjust or control the temperature of the sample chamber, e.g., a cryostat or heater that allows SPM to be performed at low or high temperatures.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 30/10).

14 Fluid environment (EPO):

This subclass is indented under subclass 12. Subject matter including means that can adjust or control the parameters, i.e. pressure or compositions, of the materials of the environment inside the sample chamber.

(1) Note: Materials of the fluid environment can be of liquid state or gas.

(2) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 30/12).

15 Liquid environment (EPO):

This subclass is indented under subclass 14. Subject matter wherein the fluid environment is a liquid such as water or other liquid chemical inside the sample chamber.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 30/14).

16 Vacuum environment (EPO):

This subclass is indented under subclass 12. Subject matter including means that can establish or maintain no or few molecules (or atoms) inside the chamber e.g., pumping means to reduce pressure inside the chamber.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 30/16).

17 Means for protecting or isolating the interior of a sample chamber from external environmental conditions or influences, e.g., vibrations or electromagnetic fields (EPO):

This subclass is indented under subclass 8. Subject matter including means that prevents SPM from being disturbed by a condition outside the scanning probe microscope such as vibration, temperature, pressure, etc.

(1) Note: The SPM is protected as a whole under the adverse condition. For example, a specific housing or arrangement to eliminate external vibrations to assure the stability of the microscope, or shielding that protects it from electromagnetic fields.

(2) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 30/18).

SEE OR SEARCH THIS CLASS, SUBCLASS:

12, for environmental regulation means for sample chamber.

54, for regulations/error compensation means integrated in the probe.

18 Sample handling device or method (EPO):

This subclass is indented under subclass 8. Subject matter including a method or device that mechanically positions or conditions a sample for analysis or investigation (e.g., tweezers, cutting means).

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 30/20).

SEE OR SEARCH CLASS:

73, Measuring and Testing, subclasses 863 through 864.91 for sample and sample handling in general.

19 CALIBRATION ASPECT, E.G., CALIBRATION OF PROBES (EPO):
This subclass is indented under the class definition. Subject matter including a method or apparatus used to adjust or rectify a SPM device, e.g., the probe itself, to a desired standard.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 40/00).

SEE OR SEARCH CLASS:
702, Data Processing; Measuring, Calibrating, or Testing, subclass 104 for calibrating or correcting a tranducer in a data processing system or calculating computer of a measurement or testing system.

20 Calibration standards or methods of fabrication thereof (EPO):
This subclass is indented under subclass 19. Subject matter including a structure with nanometric resolution used for correcting or fixing the performance of the SPM device before its utilization, e.g., grating with a known line separation; and its related manufacture.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 40/02).

21 PARTICULAR TYPE OF SCANNING PROBE MICROSCOPY [SPM] OR MICROSCOPE; ESSENTIAL COMPONENTS THEREOF (EPO):
This subclass is indented under the class definition. Subject matter including a method or device for which the type of interaction between the scanning probe tip and the sample surface is specified.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/00).

SEE OR SEARCH CLASS:
250, Radiant Energy, subclasses 306 through 311 for the inspection of solids or liquids by inspected and which pass near to or through the object, or are reflected from or diffracted by the object, or secondary radiations emitted from the object, are detected.
977, Nanotechnology, subclasses 849 through 881 for subject matter appropriately crossed into this cross reference art collection.

22 Multiple-type SPM, i.e., involving two or more SPM techniques (EPO):
This subclass is indented under subclass 21. Subject matter involving two or more different types of interactions.

(1) Note: The device can contain either one probe or more than one probe to perform different types of SPM over the sample. Although, a cantilever-type SNOM can perform the function of AFM, not every SNOM of such a type should be classified here.

(2) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/02).

SEE OR SEARCH THIS CLASS, SUBCLASS:
30, for cantilever-type SNOMs which are explicitly built for AFM performances.
55, for devices containing array of tips with similar performance function.

SEE OR SEARCH CLASS:
369, Dynamic Information Storage or Retrieval, subclass 13.33 for storage or retrieval by the simultaneous application of a magnetic field and near field optics.

23 Scanning Tunnelling Microscopy [STM] combined with Atomic Force Microscopy [AFM] (EPO):
This subclass is indented under subclass 22. Subject matter wherein the two interactions are tunnelling current (STM) and the attractive or repulsive force between the probe and the sample surface (AFM).

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/04).

SEE OR SEARCH THIS CLASS, SUBCLASS:
26, for specific STMs.
33, for specific AFMs.

24 Scanning Near-field Optical Microscopy [SNOM] combined with Atomic Force Microscopy [AFM] (EPO):
This subclass is indented under subclass 22. Subject matter wherein the two interactions involve near-field light emitted from the sample surface (SNOM) and the attractive or repulsive force between the probe and the sample surface (AFM).

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/06).

SEE OR SEARCH THIS CLASS, SUBCLASS:
30, for specific SNOMs.
33, for specific AFMs.

25 Magnetic Force Microscopy [MFM] combined with Atomic Force Microscopy [AFM] (EPO):
This subclass is indented under subclass 22. Subject matter wherein the two interactions are between the magnetic force between the sample and the probe (MFM) and the attractive or repulsive force between the probe and the sample surface (AFM).

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/08).

SEE OR SEARCH THIS CLASS, SUBCLASS:
46, for specific MFMs.
33, for specific AFMs.

26 Scanning Tunnelling Microscopy [STM] or apparatus therefor, e.g., STM probes (EPO):
This subclass is indented under subclass 21. Subject matter wherein the monitored interaction is the tunnelling current between the tip and the sample which are in very close proximity but not actually in physical contact.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/10).

SEE OR SEARCH CLASS:
360, Dynamic Magnetic Information Storage or Retrieval, subclass 324.2 for magnetic recording heads having a tunnel junction effect.
977, Nanotechnology, subclass 861 for subject matter classified in this subclass and its indents is requested to be appropriately crossed into the cross reference art collection class.

27 Scanning Tunnelling Spectroscopy [STS] (EPO):
This subclass is indented under subclass 26. Subject matter including analyzing or investigating the local electronic state of surface.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/12).

28 Scanning Tunnelling Potentiometry [STP] (EPO):
This subclass is indented under subclass 26. Subject matter including analyzing or investigating of electric potential distribution on the sample.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/14).

29 Probes, their manufacture, or their related instrumentation, e.g., holders (EPO):
This subclass is indented under subclass 26. Subject matter including a specific aspect of the probe, its manufacture, or its related instrumentation, e.g., holders.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/16).

SEE OR SEARCH THIS CLASS, SUBCLASS:
60, for process of probe fabrication that is not applied to any specific type of scanning probe.

30 Scanning Near-Field Optical Microscopy [SNOM] or apparatus therefor, e.g., SNOM probes (EPO):
This subclass is indented under subclass 21. Subject matter wherein the monitored interaction involves near-field light emitted or reflected from the sample surface.

(1) Note: subject matter classified in this subclass and its indents is requested to be appropriately crossed into the cross reference.

(2) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/18).

SEE OR SEARCH CLASS:
369, Dynamic Information Storage or Retrieval, subclass 13.33 for storage or retrieval by the simultaneous application of a magnetic field and near field optics, and subclasses 43- 44.42 for information storage or retrieval with servo positioning of transducer assembly over track combined with information signal processing.
977, Nanotechnology, subclass 862 for subject matter classified in this subclass and its indents is requested to be appropriately crossed into the cross reference art collection class.

31 Fluorescence (EPO):
This subclass is indented under subclass 30. Subject matter wherein the near-field light to be monitored is the emission from a sample surface excited by an electromagnetic wave.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/20).

32 Probes, their manufacture, or their related instrumentation, e.g., holders (EPO):
This subclass is indented under subclass 30. Subject matter including a specific aspect of the probe, its manufacture, or its related instrumentation, e.g., holders.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/22).

SEE OR SEARCH THIS CLASS, SUBCLASS:
60, for process of probe fabrication that is not applied to any specific type of scanning probe.

33 Atomic Force Microscopy [AFM] or apparatus therefor, e.g., AFM probes (EPO):
This subclass is indented under subclass 21. Subject matter wherein the monitored interaction is the short range repulsive or long range attractive force between the probe and atoms of the sample surface.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/24).

SEE OR SEARCH CLASS:
977, Nanotechnology, subclass 863 for subject matter classified in this subclass and its indents is requested to be appropriately crossed into the cross reference art collection class.

34 Friction force microscopy (EPO):
This subclass is indented under subclass 33. Subject matter wherein the force is the shear force between probe and atoms of the sample surface.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/26).

35 Adhesion force microscopy (EPO):
This subclass is indented under subclass 33. Subject matter wherein the force monitored is the force that tends to keep the probe in contact with the sample surface.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/28).

36 Scanning potential microscopy (EPO):
This subclass is indented under subclass 33. Subject matter wherein the force is an electric interaction affected by the electric potential distribution on the sample surface. (e.g., Kelvin probe microscopy and Scanning Maxwell stress microscopy, etc.).

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/30).

37 AC mode (EPO):
This subclass is indented under subclass 33. Subject matter wherein the probe is, or is mounted on, a vibrating cantilever.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/32).

38 Tapping mode (EPO):
This subclass is indented under subclass 37. Subject matter wherein tip of probe touches periodically the sample surface.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/34).

39 DC mode (EPO):
This subclass is indented under subclass 33. Subject matter wherein the probe is, or is mounted on, a static (i.e., vibrationless) cantilever.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/36).

40 Probes, their manufacture, or their related instrumentation, e.g., holders (EPO):
This subclass is indented under subclass 33. Subject matter including a specific aspect of the probe, its manufacture, or its related instrumentation, e.g., holders.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/38).

SEE OR SEARCH THIS CLASS, SUBCLASS:
60, for process of probe fabrication that is not applied to any specific type of scanning probe.

41 Conductive probes (EPO):
This subclass is indented under subclass 40. Subject matter wherein the probe is made of a material that conducts electric charges.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/40).

SEE OR SEARCH THIS CLASS, SUBCLASS:
23, for conductive probes that perform the function of STM probes.

42 Functionalization (EPO):
This subclass is indented under subclass 40. Subject matter including adding specific particles to the tip to give it another characteristic, e.g., specific chemical receptor for biochemical analysis.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/42).

SEE OR SEARCH THIS CLASS, SUBCLASS:
61, for functionalization of tips that are not specifically for atomic force microscopes.

43 Scanning Ion-Conductance Microscopy [SICM] or apparatus therefor, e.g., SICM probes (EPO):
This subclass is indented under subclass 21. Subject matter wherein the interaction to be observed is ion flow between the probe tip and the sample surface.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/44).

SEE OR SEARCH CLASS:
977, Nanotechnology, subclass 861 for subject matter classified in this subclass and is requested to be appropriately crossed into the cross reference art collection class.

44 Scanning Capacitance Microscopy [SCM] or apparatus therefor, e.g., SCM probes (EPO):
This subclass is indented under subclass 21. Subject matter wherein the interaction to be observed is the electrical capacity between tip and the sample surface.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/46).

SEE OR SEARCH CLASS:

977, Nanotechnology, subclass 866 for subject matter classified in this subclass and is requested to be appropriately crossed into the cross reference art collection class.

45 Probes, their manufacture, or their related instrumentation, e.g., holders (EPO):
This subclass is indented under subclass 44. Subject matter including a specific aspect of the probe, its manufacture, or its related instrumentation, e.g. holders.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/48).

46 Magnetic Force Microscopy [MFM] or apparatus therefor, e.g., MFM probes (EPO):
This subclass is indented under subclass 21. Subject matter wherein the interaction is a magnetic force between the sample and the tip.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/50).

SEE OR SEARCH CLASS:

977, Nanotechnology, subclass 865 for subject matter classified in this class and is requested to be appropriately crossed into the cross reference art collection class.

47 Resonance (EPO):
This subclass is indented under subclass 46. Subject matter wherein a spin magnetic moment is induced by a specific magnetic field frequency.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/52).

48 Probes, their manufacture, or their related instrumentation, e.g., holders (EPO):
This subclass is indented under subclass 46. Subject matter including a specific aspect of the probe, its manufacture, or its related instrumentation, e.g., holders.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/54).

SEE OR SEARCH THIS CLASS, SUBCLASS:

60, for process of probe fabrication that is not applied to any specific type of scanning probe.

SEE OR SEARCH CLASS:

977, Nanotechnology, subclasses 872 through 879 for subject matter classified in these subclasses and their indents are requested to be appropriately crossed into the cross reference art collection class.

49 Probes with magnetic coating (EPO):
This subclass is indented under subclass 48. Subject matter including a probe tip which is covered by some material with a magnetic property.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/56).

50 Scanning thermal microscopy [SThM] or apparatus therefor, e.g., SThM probes (EPO):
This subclass is indented under subclass 21. Subject matter wherein the monitored interaction is the heat or temperature of the sample surface.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/58).

SEE OR SEARCH CLASS:

977, Nanotechnology, subclass 867 for subject matter classified in this subclass and is requested to be appropriately crossed into the cross reference art collection class.

51 Scanning Electro-Chemical Microscopy [SECM] or apparatus therefor, e.g., SECM probes (EPO):
This subclass is indented under subclass 21. Subject matter wherein the monitored interaction that is monitored is the Faraday current generated by an electrochemical reaction.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 60/60).

SEE OR SEARCH CLASS:
977, Nanotechnology, subclasses 872 through 879 for subject matter classified in these subclasses and their indents are requested to be appropriately crossed into the cross reference art collection class.

52 GENERAL ASPECTS OF SPM PROBES, THEIR MANUFACTURE, OR THEIR RELATED INSTRUMENTATION, INSOFAR AS THEY ARE NOT SPECIALLY ADAPTED TO A SINGLE SPM TECHNIQUE (EPO):
This subclass is indented under the class definition. Subject matter including a SPM probe, its manufacture, or its related instrumentation, insofar as not peculiar to a specific SPM technique.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 70/00).

SEE OR SEARCH CLASS:
977, Nanotechnology, subclasses 872 through 879 for subject matter classified in these subclasses and their indents are requested to be appropriately crossed into the cross reference art collection class.

53 Probe holders (EPO):
This subclass is indented under subclass 52. Subject matter including means to mount a probe in a scanning probe microscope.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 70/02).

SEE OR SEARCH CLASS:
73, Measuring and Testing, subclass 866.5 for probes mountings in which a particular sensing element is either not specified or not otherwise provided for, or there are plural sensing elements, none of which is otherwise provided for.

54 With compensation for temperature or vibration induced errors (EPO):
This subclass is indented under subclass 53. Subject matter including means integrated in the probe holder that can adjust the probe to correct for errors caused by temperature variations or vibrations.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 70/04).

SEE OR SEARCH THIS CLASS, SUBCLASS:
11, for error compensation in general.
17, for protection of the scanning probe microscope in general.

55 Probe tip arrays (EPO):
This subclass is indented under subclass 52. Subject matter wherein multiple tips of similar characteristics form a line or a matrix.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 70/06).

56 Probe characteristics (EPO):
This subclass is indented under subclass 52. Subject matter including a specific aspect of the probe.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 70/08).

SEE OR SEARCH THIS CLASS, SUBCLASS:
60, for process of probe fabrication.

SEE OR SEARCH CLASS:
73, Measuring and Testing, subclass 866.5 for probes in which a particular sensing element is either not speci-

fied, not otherwise provided for, or there are plural sensing elements, none of which is otherwise provided for.

977, Nanotechnology, subclasses 875 through 879 for subject matter classified in these subclasses and their indents are requested to be appropriately crossed into the cross reference art collection class.

57 Shape or taper (EPO):

This subclass is indented under subclass 56. Subject matter wherein the physical form of the tip or the degree of slope or angle of the tip is specified.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 70/10).

58 Nanotube tips (EPO):

This subclass is indented under subclass 57. Subject matter wherein the probe has a nano-sized tube such as Carbon Nanotube.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 70/12).

SEE OR SEARCH CLASS:

977, Nanotechnology, subclasses 875 through 879 subject matter classified in these subclasses and their indents are requested to be appropriately crossed into the cross reference art collection class.

59 Particular materials (EPO):

This subclass is indented under subclass 56. Subject matter wherein the scanning probe or a component thereof (e.g., a cantilever or a covering material on the tip) is made of some material that gives a particular property to the scanning probe.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 70/14).

60 Probe Manufacture (EPO):

This subclass is indented under subclass 52. Subject matter including processes of probe fabrication.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 70/16).

61 Functionalization (EPO):

This subclass is indented under subclass 60. Subject matter including adding specific particles to the probe tip to give it another characteristic, e.g., specific chemical receptor for biochemical analysis.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 70/18).

62 APPLICATIONS OF SCANNING-PROBE TECHNIQUES OTHER THAN SPM (EPO):

This subclass is indented under the class definition. Subject matter including a specific application of a scanning-probe technique not otherwise provided for.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 80/00).

SEE OR SEARCH CLASS:

216, Etching a surface: Processes, appropriate subclasses for surface etching processing using SPM.

360, Dynamic magnetic Information Storage or Retrieval, appropriate subclasses for information recording using SPM in accordance with means for recording.

369, Dynamic Information Storage or Retrieval, appropriate subclasses for information recording using SPM in accordance with means for recording.

427, Coating Process, appropriate subclasses for surface coating processing using SPM; especially subclasses 357 through 601 for coating processes with direct application of electrical, magnetic, wave, or particular energy using SPM.

720, Dynamic Optical Information Storage or Retrieval, appropriate subclasses for information recording using SPM in accordance with means for recording.

63 SCANNING-PROBE APPARATUS OR TECHNIQUES NOT OTHERWISE PROVIDED FOR (EPO):

This subclass is indented under the class definition. Subject matter including general or specific scanning-probe apparatus or techniques not otherwise provided for.

(1) Note. The subject matter in this subclass is substantially the same in scope as ECLA (G01Q 90/00).

END