

19

7. A scanning probe microscope comprising:
 a hollow scanner having a moving end movable in three-dimensional directions;
 a cantilever removably attached to the moving end of the scanner;
 a displacement sensor including a light emitting element capable of applying a light beam to the cantilever and a light receiving element capable of receiving reflected light from the cantilever, whereby the displacement of the cantilever is detected optically; and
 a position adjusting mechanism capable of adjusting the position of the displacement sensor so that the light beam emitted from the light emitting element can be applied at a constant angle of incidence to a constant position on the cantilever and the reflected light from the cantilever can always be applied to a light receiving surface of the light receiving element while the moving end of the scanner is being moved,
 the position adjusting mechanism including a light receiving element position adjusting unit for adjustably supporting the light receiving element in a predetermined position in the scanner and a light emitting element position adjusting unit for adjustably supporting the light emitting element in a predetermined position outside the scanner.
8. A scanning probe microscope according to claim 7, wherein said scanner comprises a hollow tube, and said light receiving element position adjusting unit always situates a center of the light receiving surface of the light receiving element substantially in a center portion of the scanner while the moving end of the scanner is being moved.
9. A scanning probe microscope according to claim 8, wherein said light receiving element position adjusting unit includes a position adjusting scan unit locatable in the scanner and a position adjusting support member capable of supporting the position adjusting scan unit in the scanner.
10. A scanning probe microscope according to claim 7, wherein said light emitting element position adjusting unit includes a stationary system having a guide surface in a specific shape, a movable system movable along the guide surface of the stationary system in a manner such that the movable system supports the displacement sensor, and a drive system capable of adjusting the position of the light emitting element by causing the movable system to move along the guide surface of the stationary system.
11. A scanning probe microscope according to claim 10, wherein said drive system includes a plurality of actuators such that the movable system can be moved along the guide surface of the stationary system by driving the actuators in response to an electrical signal applied to the scanner.

20

12. A scanning probe microscope comprising:
 a scanner having a moving end movable in three-dimensional directions and a stationary end fixed to a base;
 a cantilever removably attached to the moving end of the scanner;
 a light emitting element which is provided on the moving-end side of the scanner and which applies a light beam at a constant angle of incidence to a constant position on the cantilever;
 a light receiving element which receives reflected light from the cantilever; and
 a light receiving element position adjusting unit which is attached to the base and which adjusts the position of the light receiving element so that the reflected light from the cantilever can always be applied to a light receiving surface of the light receiving element while the moving end of the scanner is being moved.
13. A scanning probe microscope according to claim 12, which further comprises a reflector mirror provided in an optical path between the light emitting element and the cantilever so that the position and the angle of incidence of the light beam applied to the cantilever can be adjusted by regulating the reflector mirror.
14. A scanning probe microscope according to claim 12, wherein said scanner comprises a hollow tube, and said light receiving element position adjusting unit fixes a center of the light receiving surface of the light receiving element substantially in a center portion of the scanner by position adjustment.
15. A scanning probe microscope according to claim 14, wherein said light receiving element position adjusting unit includes a position adjusting support member for supporting the light receiving element, and said light receiving element is fixed by position adjustment so that the center of the light receiving surface of the light receiving element is always situated substantially in the center portion of the scanner.
16. A scanning probe microscope according to claim 12, which further comprises an adjusting mechanism which adjusts respective positions of the light emitting element and the cantilever.
17. A scanning probe microscope according to claim 16, wherein said adjusting mechanism includes a light emitting element position adjusting unit and a cantilever position adjusting unit, each said unit being movable in a direction of at least one axis so that a position of application of the light beam to the cantilever can be adjusted.

* * * * *