



Division of the History of Chemistry  
American Chemical Society



## Citation for Chemical Breakthrough

United States Patent [19] [11] 4,343,993  
Binnig et al. [45] Aug. 10, 1982

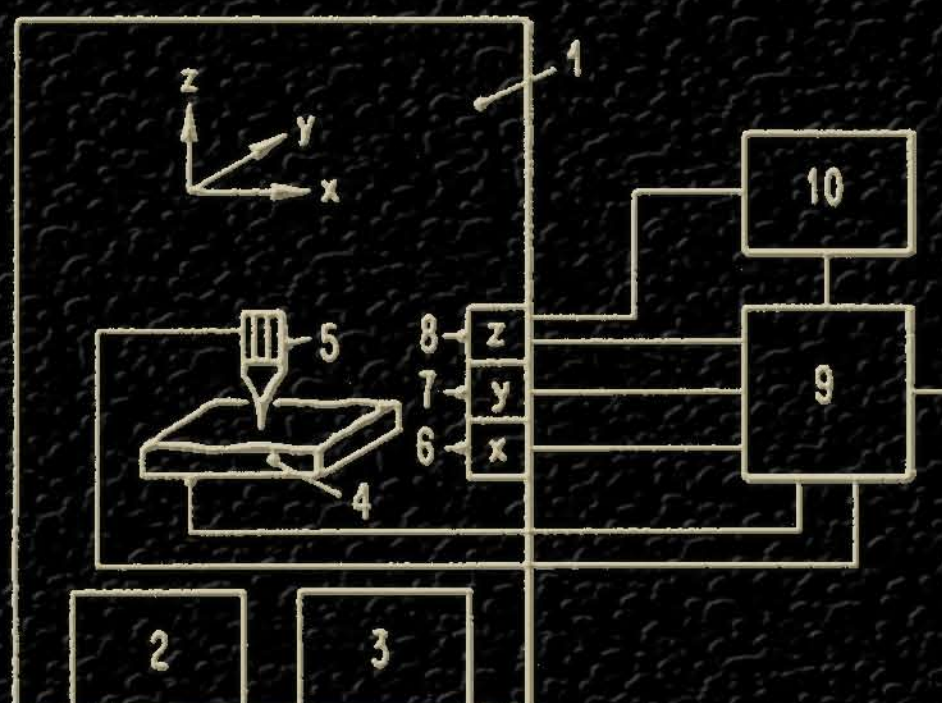
[54] SCANNING TUNNELING MICROSCOPE

[75] Inventors: Gerd Binnig; Heinrich Rohrer, both  
of Richterswil, Switzerland

[73] Assignee: International Business Machines  
Corporation, Armonk, N.Y.

[21] Appl. No.: 186,923

[22] Filed: Sep. 12, 1980



[57] ABSTRACT

The vacuum tunnel effect is utilized to form a scanning tunneling microscope. In an ultra-high vacuum at cryogenic temperature, a fine tip is raster scanned across the surface of a conducting sample at a distance of a few Angstroms. The vertical separation between the tip and sample surface is automatically controlled so as to maintain constant a measured variable which is proportional to the tunnel resistance, such as tunneling current. The position of the tip with respect to the surface is controlled preferably by piezo electric drive means acting in three coordinate directions. The spatial coordinates of the scanning tip are graphically displayed. This is conveniently done by displaying the drive currents or voltages of piezo electric drives.

Presented to the IBM Zürich Research Laboratory  
Rüschlikon, Switzerland  
2008