USF Available Technologies

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Carbon Nanotube Oscillator Surface Profiling Device and Method of Use

Researchers at the University of South Florida have proposed a novel intervention as an alternative to the existing atomic force microscope tips used to determine surface roughness.

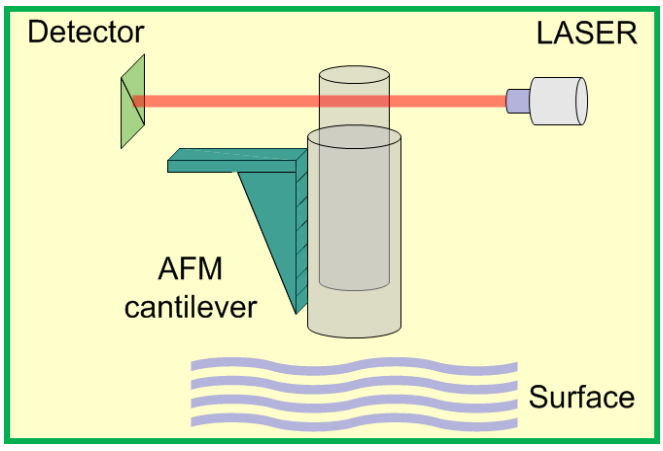
Microscopes are instruments used to enhance our vision to see things that are too small to see with the naked eye. Evolution of microscopes has lead to the development of scans from the micrometer scale to the much smaller nanometer scale. Scanning probe microscopes, such as the Atomic Force Microscope (AFM), are examples of scanning probe imaging and sensing devices. These devices are useful for surface profiling. An AFM measures the microscopic surface profile of a material using a nanoscale "needle" to probe the surface. However, the resolution of the AFM is limited. Accordingly, there is a need for system to scan the surface roughness with an improved resolution over the AFM systems.

Researchers at USF have developed a carbon nanotube (CNT) oscillator surface profiling device. The invention is able to scan the roughness of the surface without coming in contact with the surface. The laser detector includes a laser to emit a laser beam and a laser detector positioned in-line with the laser. The detector measures the intensity of the laser beam emitted by the laser as the oscillatory tube oscillates. The CNT oscillator will provide an improved resolution over an atomic force microscope (AFM) tip operating in non-contact mode. This device can be used for nano-measurements in medicine, microelectronics, micro-composites, other biotechnology, and general materials analysis.

ADVANTAGES:

- **Lasts longer than current probes**
- **Resistant to wear and tear**
- **Provides higher resolution scans**
- **Provides stable imaging conditions**

Improved Resolution Scans



Schematic of the CNT Oscillator

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