



Plastic Cantilevers for Atomic Force Microscopy

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a robust batch process for quickly and economically producing polymer-based cantilevers.

Overview

The atomic force microscope (AFM), one of many types of scanned-proximity probe microscopes, images a sample by lightly touching it with a probe tip attached to the end of an extremely flexible leaf spring cantilever. Almost all AFM cantilevers are made of silicon or silicon nitride, and are manufactured using a microlithography process similar to the one used to make computer chips. These traditional cantilevers are expensive, typically costing at least \$100 for a single replacement cantilever with a tip. They are also relatively brittle and inflexible, making them more susceptible to damage than other materials like plastics, and opaque, so they obscure the sample area being imaged.

The Invention

UW-Madison researchers have developed a robust batch process for quickly and economically producing polymer-based cantilevers for atomic force microscopy. First, a master cantilever with a tip is used to create a mold. Next, the tip cavity within the mold is filled with a tip material, such as polystyrene or a magnetic metal. The remainder of the mold cavity is filled with plastic, preferably polystyrene, to form a plastic cantilever with a tip of the desired material. Multiple master cantilevers can be used to form multiple molds, so that the desired number of plastic cantilevers can be produced. At least one surface of the plastic cantilever can be coated with a reflective material, such as gold.

Applications

- Atomic force microscopy

Key Benefits

- Economical - cantilevers are produced by a batch process under much less rigid manufacturing conditions than traditional cantilevers
- More user-friendly
- More durable and compliant, thus more sensitive to force
- Reduce distortion when imaging biological and soft materials
- Transparent, simplifying placement of objects in preparation for microscopic viewing
- Washable and reusable

- Can be functionalized for use in magnetic force microscopy by attaching a probe tip formed of magnetic metal

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Additional Information

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For More Information About the Inventors

- [Daniel van der Weide](#)

Tech Fields

- [Analytical Instrumentation, Methods & Materials : Microscopy](#)

For current licensing status, please contact Emily Bauer at emily@warf.org or 608-960-9842

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