Improved Method for Releasing Micromechanical Structures

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing an efficient method for freeing micromechanical structures that have been bonded to a substrate.

OVERVIEW

Stiction refers to the static friction that needs to be overcome to enable relative motion of stationary objects in contact. In micromachined parts, separating two surfaces is often complicated due to the fragile nature of the microstructures. Several methods for preventing bonding and also for releasing such microstructures have been developed; however, these methods offer little directional control and are not always suitable for surface micromachined parts due to the effects of surface tension and stiction. Additionally, problems are seen with in-use stiction, where previously released microparts become stuck to the substrate or to other parts. A new method for releasing micromachined parts that have been stiction bonded is needed.

THE INVENTION

UW–Madison researchers have developed a method of freeing a micromachined part from the surface of a substrate to which the micropart is stiction bonded. An external piezoelectric force is applied to the bottom surface of the substrate, sending a pulse stress wave through the substrate, which propagates from the bottom surface and reflects over the top surface. The reflection of the wave causes a rapid up and down displacement of the surface, which breaks the bond between the micropart and the substrate surface. This method also can be used to displace a micropart that is in contact with a substrate top surface, but not bonded to it.

APPLICATIONS

• Micromachined parts and actuators and the assembly of micromachines

KEY BENEFITS
• Can be used after the micromachined devices are fully formed, assembled and packaged
• Can be used at any time during the useful life of the device

ADDITIONAL INFORMATION

Tech Fields
Micro & Nanotech - MEMS & NEMS

CONTACT INFORMATION

For current licensing status, please contact Mark Staudt at mstaudt@warf.org or 608-960-9845.