Polyimide as a Structural Material in Piezoelectrically Actuated Microelectromechanical Systems

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ABSTRACT:

The use of polyimide as a structural material in microelectromechanical systems has been explored in past but has not been widely used as such a material. The material properties of polyimide are well suited for use in a multitude of actuators. This work demonstrates the use of polyimide as a structural material in one such actuator application, a micromirror device. The micromirror device discussed in this work is actuated using piezoelectric cantilevers. The micromirrors are operated at resonant frequency of approximately 30 Hz. These micromirror devices were fabricated using conventional micromachining processes on a single silicon wafer, which requires no post processing. The polyimides used for the fabrication of the devices were photodefinable, which further simplifies the processing of the devices. The current fabrication technique serves as a proof of concept for the use of polyimides in micromachined actuators. In this paper the modeling and fabrication of the prototype micromirror devices is discussed.

KEYWORDS: polyimide, microelectromechanical systems, photodefinable, micromachining, micromirror

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