High Piezoelectric Coefficient Ferroelectric Films for MEMS Applications

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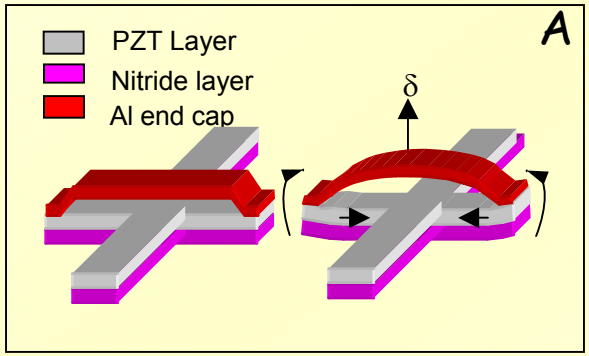
Micromachined Flextensional Actuators

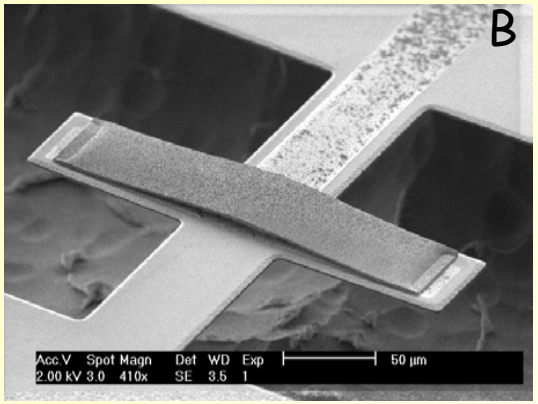
High displacement MEMS actuators enable faster switches for cell phones, and lower drive voltages for integration of actuators into system-on-a-chip architectures.

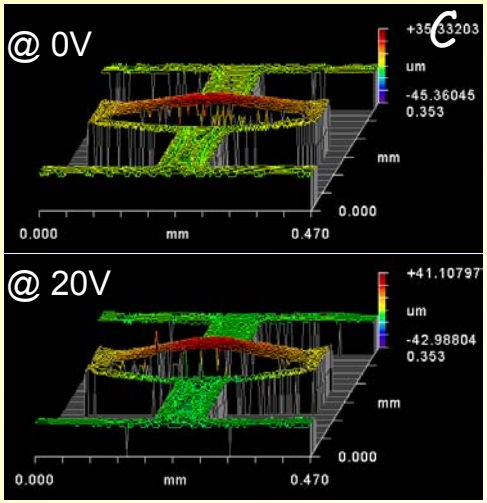
Here, flexural elements micromachined on Lead Zirconate Titanate (PZT) piezoelectric unimorphs act as mechanical transformers to convert the large generative force of the piezoelectric thin film into increased displacement (A&B).

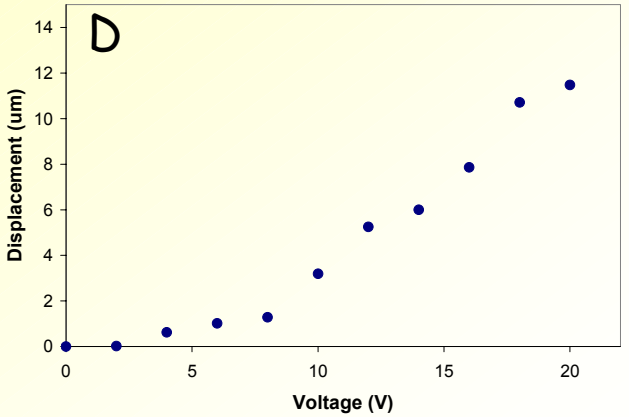
Static flexure displacement measurements were performed (C&D). A displacement amplification factor of ~28 was experimentally measured

First resonance frequency for a 400μm long device was 19.75 kHz.









Submitted for Presentation at MEMS 2005

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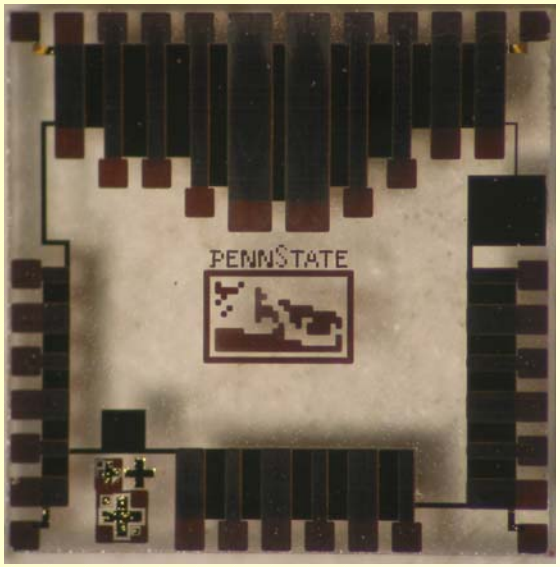
Education:

- Han Guen Yu completed his M.S. degree and is currently working on his Ph.D. research.
- The laboratory MEMS Course, EE 597F: MEMS Device Technology, was offered in Spring Semester 2004.
- A graduate class in Crystal Chemistry was substantially revised and offered Spring 2003.
- One undergraduate (Ioanna Mina) completed a senior thesis, and will present her work at the International Symposium on Applications of Ferroelectrics



MEMS Test Chip Fabricated by EE 597F Students

Outreach:

The PI's supervised research projects under the NSF funded Research Experience for Undergraduates (REU) students program.