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Mechanical Characterization of Micro-Sized Materials

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MEMS technology in the fields of information technology, automotive systems and biomedical applications has been developed rapidly, evolving to the stage of industrial manufacturing and commercialization. In MEMS structures, free standing micromechanical components are involved to construct moving parts including micro-beams and membranes. In order to design durable and reliable MEMS devices, it is required to know the mechanical properties of free standing thin films on the micrometer scale. There are several length scale effects on the mechanical properties of such micro-sized elements. These effects, however, are not yet fully understood. In addition, the microstructure of thin films depends upon their preparation method and defects that may be introduced during processing. The microstructure of and defects in thin films are considered to affect the mechanical properties of micro-sized elements in MEMS devices. The development of a methodology for evaluating reliable mechanical properties at the micrometer scale is therefore required. We have developed mechanical testing machines that can apply both static and cyclic loads to micro-sized specimens and investigated the effects of specimen size on mechanical properties, including fracture and fatigue. In this talk, the mechanical characterization of micro-sized materials, which are extremely important for designing actual MEMS devices, are summarized, and the scaling effects are also discussed. In addition, the application of this micromechanical testing method to measure the mechanical properties of microstructural constituents including fracture toughness of interface and grain boundary is mentioned.

Keywords: MEMS, Micro-Sized Materials

PT-2

한국 학술진흥재단 학술연구조성사업의 소개

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1. 학진의 소개
2. 학술연구조성사업의 종류, 신청자격, 사업의 목적, 예산 등
3. 심사절차

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