

고온 M/NEMS용 3C-SiC 마이크로 히터 특성

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The characteristics of polycrystalline 3C-SiC microhotplates for high temperature M/NEMS

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Abstract : The microhotplates consisting of a Pt-ased heating element on AlN/poly 3C-SiC layers were fabricated. The microhotplate has a $600\ \mu\text{m} \times 600\ \mu\text{m}$ square shaped membrane which made of $1\ \mu\text{m}$ thick polycrystalline 3C-SiC suspended by four legs. 3C-SiC is known for excellent chemical durability, mechanical strength and sustaining of high temperature. The membrane is fabricated by surface micromachining using oxidized Si sacrificial layer. The Pt thin film is used for heating material and resist temperature sensor. The fabrication methodology allows intergration of an array of heating material and resist temperature detector. For reasons of a short response time and a high sensitivity a uniform temperature profile is desired. The dissipation of microhotplate was examined by a IR thermoviewer and the power consumption was measured. Measured and simulated results are compared and analyzed. Thermal characterization of the microhotplates shows that significant reduction in power consumption was achieved using suspended structure.

Key Words : Polycrystalline 3C-SiC, microhotplate, AlN layer