도핑량에 따른 다결정 3C-SiC 마이크로 공진기의 특성

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Characteristics of polycrystalline 3C-SiC micro resonators with doping concentrations

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Abstract : This paper describes the fabrication and characteristicsof polycrystalline (poly) 3C-SiC microresonators with 3 x 10^{17} ~ 1 x 10^{19} cm^{-3} *in-situ* N-doping concentrations. In this work, the crystallinity, carrier concentration and surface morphology of the grown thin films were evaluated by X-ray diffraction (XRD), scanning electron microscopy (SEM) and atomic force microscopy (AFM). The 1.2 ㎛ thick cantilevers and the 0.4 ㎛ thick doubly-clamped beam microresonators with various lengths were implemented using *in-situ* doping poly 3C-SiC thin films. The characteristics of the poly 3C-SiC microresonators were evaluated using quartz and a laser vibrometer under vacuum at room temperature. The resonant frequencies of the SiC microresonators decreased with doping concentrations owing to the reduction of the Young's modulus of the poly 3C-SiC thin films. It was confirmed that the resonant frequencies of the poly 3C-SiC microresonators are controllable by adjusting the doping concentrations.

Key Words : Resonator, polycrystalline 3C-SiC, dopant amount