CVD로 *in-situ* 도핑된 다결정 3C-SiC 박막의 기계적 특성

이규환, 정귀상
울산대학교

Mechanical properties of In-situ doped polycrystalline 3C-SiC thin films grown by CVD

Kyu-Hwan Lee, Gwiy-Sang Chung
University of Ulsan

Abstract : 3C-SiC thin films are widely used in extreme environments, radio frequency (RF) environments, and bio-materials for micro/nano electronic mechanical systems (M/NEMS). The mechanical properties of 3C-SiC thin films need to be considered when designing M/NEMS, so Young's Modulus and the hardness need to be accurately measured. Young's Modulus and the hardness are influenced by N-doping. In this paper, we show that the mechanical properties of poly (polycrystalline) 3C-SiC thin films are influenced by the N-doping concentration. Furthermore, we measure the mechanical properties of 3C-SiC thin films for N-doping concentrations of 1%, 3%, and 5%, by using nanoindentation. For films deposited using a 1% N-doping concentration, Young's Modulus and the hardness were measured as 270 GPa and 30 GPa, respectively. When the surface roughness of the thin films was investigated by using atomic force microscopy (AFM), the roughness of the 5% N-doped 3C-SiC thin film was the lowest of all the films, at 15 nm.

Key Words : Poly 3C-SiC, Young's modulus, Hardness, In-situdoping