

## **Study on Application Tests of MEMS and Nano-devices using SiC Thin Films and Nano-wires Grown by MOCVD**

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Silicon Carbide (SiC) is an attractive material for MEMS(Micro Electro Mechanical Systems) applications. Silicon Carbide have many superior properties, such as large band gap energy (2.3~3.4 eV), high thermal conductivity (3.2~4.9 W/Cm K), high electron mobility (1000 cm<sup>2</sup>/Vs) and good physical and chemical resistance.

Therefore, we have been tried to find the most in suit conditions for the deposition process of single crystallinity SiC thin films. Silicon Carbide thin films were prepared on silicon (100) substrates by thermal MOCVD using a single source precursor at difference growth temperatures in the range of 700~1000°C. Also, SiC films were deposited on Si (100) substrate using single molecular precursors such as ,1,3-disilabutane at pressures  $2.0 \times 10^{-6}$  Torr without carrier and bubble gas by thermal MOCVD method. The optimum temperature for the formation of the single crystallinity Silicon Carbide films was found to 900°C base on XRD, SEM and AFM results. Analysis results show that SiC films have single crystal, smooth surface (RMS=30 nm), over 1  $\mu$ m thickness.

Also, Silicon carbide (SiC) nano-structure would be favorable for applications in high temperature, high power, and high frequency nanoelectronic devices. Moreover, cubic SiC (-SiC) wires exhibit good field-emitting property. With using various metallic catalyst, a study on the growth of silicon carbide nanowires by MOCVD(Mea시)-Organic Chemical Vapor Deposition) was executed. The general deposition pressure and temperatures were 50 mTorr and 1000 °C and the deposition was carried out for 2 hours.