

Deposition of epitaxial SiC film using thermal MOCVD method

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Silicon carbide (SiC) is an attractive material for micro system applications. epitaxial silicon carbide thin films have many superior properties, such as large band gap energy (2.3~3.4eV), high thermal conductivity (3.2~4.9W/Cm K), high electron mobility (1000cm²/Vs) and good physical and chemical resistance.

Therefore, we have been tried to find the most suitable conditions for the deposition process of epitaxial silicon carbide thin films. Silicon carbide thin films were deposited on Si(100) substrates by metal-organic chemical vapor deposition (MOCVD) in high vacuum condition (2.0×10^{-7} Torr) using 1,3-disilabutane as a single source precursor which contains silicon and carbide in 1:1 ratio at various temperature in the range of 700~1000°C. Also, silicon carbide thin films were deposited on Si(100) substrate at deposition pressure between 5.0×10^{-6} Torr and 1.0×10^{-6} Torr without carrier and bubble gas.

Therefore, based on experimental results from X-ray diffraction (XRD) and X-ray photoelectron spectroscopy (XPS), scanning electron microscopy (SEM), the best epitaxial silicon carbide thin films were grown at 900°C and 2.0×10^{-6} Torr.

Reference

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