

Growth of 3C-SiC nanowires on nickel coated Si(100) substrate using dichloromethylvinylsilane and diethylmethylsilane by MOCVD method

J.-S. Hyun, S.-H. Nam, B.-C. Kang and J.-H. Boo

Department of Chemistry, Sungkyunkwan University, Suwon 440-746 Korea

We have grown 3C-SiC nanowires on nickel coated Si(100) substrates using single source precursors by thermal metal-organic chemical vapor deposition (MOCVD) method. Dichloromethylvinylsilane ($\text{CH}_2\text{CHSi}(\text{CH}_3)\text{Cl}_2$) and diethylmethylsilane ($\text{CH}_3\text{SiH}(\text{C}_2\text{H}_5)_2$) were used as a single precursor without any carrier and bubbler gas. 3C-SiC nanowires with 40-100 nm diameter could grow on substrates at temperature as low as 900 °C. XRD pattern showed that SiC nanowires were cubic silicon carbide. TEM analysis showed that an amorphous carbon layer surrounds the as-deposited SiC nanowires, and the 3C-SiC nanowire has [111] growth direction with well-crystallized structure. XPS and EDX analyses showed that the as-obtained SiC nanowire has an atomic Si and C composition of about 1.0:1.2, suggesting possible applications for both electronic devices and field emitters.