

Controlled Growth of Si and SiC Nanowires Directly from NiO/Si

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A simple, direct synthesis method is used to grow core-shell Si-SiO₂ nanowires by heating NiO catalyzed silicon substrate. The main crystal growth directions of the Si and SiC nanowires were [111]. The morphology of nanowires was controlled by carbothermal reduction of WO₃ and C, which provides reductive environment to synthesize crystalline Si and SiC nanowires covered with SiO₂ sheath in the growth temperature of 1000-1100°C. After hydrofluoric acid (HF) treatment, the single crystalline silicon and silicon carbide nanowires were obtained. A solid-liquid-solid(SLS) mechanism is proposed for the growth of both core-shell Si-SiO₂ and SiC-SiO₂ nanowires. the field emission properties of the syntehsized nanowires directly grown from NiO/Si substrate are reported.