

Direct synthesis of carbon-coated SiC nanowires from Si and field emission characteristics

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A simple, direct synthesis method was used to grow carbon-coated SiC nanowires by heating the NiO catalyzed silicon substrate. The carbothermal reduction of WO_3 by C provided environment to synthesize crystalline SiC nanowires coated with carbon sheath in the growth temperature of 1000–1100°C. The main crystal growth direction of carbon-coated SiC nanowires was [111]. The cubic β -SiC nanowires were 20–50 nm in diameter and the thickness of carbon sheath was 2–3 nm. The field emission properties of the synthesized carbon-coated SiC nanowires directly grown from Si substrate were also reported. The turn on field at the emission current density of $10\mu A/cm^2$ was about 4.2 V/ μm and it showed uniform emission image.