Formation of silicon carbide whiskers via carbothermic reduction of silica

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Silicon carbide (SiC) possesses unique properties such as high thermal conductivity, excellent thermal stability, mechanical strength, and chemical inertness. The morphology of inorganic nanomaterials is known to have an important influence on their properties and use in various applications. The synthesis of Silicon carbide (SiC) nanowhiskers by using SiO2 and activated carbon powder as the raw materials at a temperature around 1600 ºC. It is thought that the Silicon carbide nanowhiskers is formed by two step process which involves the formation of gaseous SiO and reaction between SiO and CO to form silicon carbide nanowhiskers. The rate of SiC formation is controlled by the rate of SiO formation. The products were characterized by field emission scanning electron microscopy (FE-SEM), high resolution transmission electron microscopy (HR-TEM), Raman spectroscopy and X-ray diffraction (XRD). Simple and low cost synthetic route without catalyst or vacuum condition is put forward for the growth of special long SiC nanowhiskers.