

The effect of graphite type on the synthesis of SiC nanomaterials by microwave-assisted synthesis

Abstract

SiC nanomaterial (SiCNM) is known for its excellent properties and has great potential for a wide range of applications. In this article, preparation of SiCNMs from different types of graphite was performed by microwave-assisted synthesis. Different types of graphite which are graphite flake (GF) and expanded graphite (EG) were used to react with silica for the synthesis of SiCNMs in laboratory microwave furnace at 1400 °C. It was found that SiC nanowhiskers (SiCNWs) were formed when EG was used, while irregular shaped SiC nanoparticles (SiCNPs) were formed when GF was used. β -SiC appeared as the only phase in the XRD patterns for both SiCNMs formed using GF and EG. SiCNWs and SiCNPs have interplanar spacing of around 0.25 nm which is the axial direction of [111]. The difference of formation mechanism is believed to be the origin of different morphology of SiCNMs synthesized from different types of graphite.

Keywords

Carbide; Graphite; Microwave; Nanoparticles; Nanowires; Synthesis