

Fabrication of β -SiC quantum dots by photo-assisted electrochemical corrosion of bulk powders

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Abstract

Silicon carbide (SiC) quantum dots (QDs) are eminent candidates for various applications ranging from bioimaging and energy conversion, to optics. In this communication we describe a new top-down method for producing SiC QDs (< 10 nm) from bulk powder (> 50 nm) and slurry. Photo-assisted electrochemical etching is employed to obtain the quantum-sized clusters. We show that the process (hence, the amount of QDs synthesized as well as their size) can be controlled via regulating time as confirmed by both high-resolution transmission electron microscopy and photoluminescence data. The presented method may serve as a new avenue to prepare size-controlled nanoparticles of different semiconductors.

Keywords: Photoelectrochemical corrosion; Luminescence; Semiconductor; Quantum-dot