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One-pot Solvothermal Synthesis of Water-soluble Boron Nitride Nanosheets and Fluorescent Boron Nitride Quantum Dots

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Abstract

A simple route for the synthesis of boron nitride nanosheets (BNNSs) and boron nitride quantum dots (BNQDs) simultaneously was demonstrated in this study. The synthesis is accomplished by the high temperature solvothermal treatment of bulk BN in aqueous NaOH. The morphology and properties of the formed BNNSs and BNQDs were characterized, and the results suggest that the bulk h-BN can be efficiently exfoliated to BNNSs and BNQDs. The excellent colloidal stability of BNNSs and PL emission of BNQDs make them promising candidates for biological applications.

Key words

Boron nitride; Nanosheets; Nanoparticles; Luminescence; Bioimaging; Biomaterials

Introduction

Hexagonal boron nitride (h-BN), also known as “white graphene”, has been attracting great interest because of its excellent chemical and thermal stability, as well as its unique electronic and optical properties [1]. Recent studies have showed that 2 D boron nitride nanosheets (BNNSs) and 0 D boron nitride quantum dots (BNQDs) have better performance than the bulk counterpart in a series of applications. Therefore, the demand for a method to produce high quality BNNSs and BNQDs is imminently needed.

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