

"Boron Nitride Nanotubes (BNNTs) for Thermal Management and Structural Reinforcement."

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Abstract

Boron nitride nanotubes (BNNTs) are highly interesting for structural, thermal, and biomedical applications but have, thus, far been limited due to a lack of highyield methods to produce a purified material. In particular, previous attempts have failed to fully remove h-BN due to its chemical similarity with the BNNTs. Here, we propose a mild, high-yield method that removes >99% of the h-BN impurities without any apparent loss or damage to the BNNTs. This is in contrast to all prior methods, which have used aggressive chemical, mechanical, or thermal methods and, therefore, suffered from low yields and significant damage to the tubes. Our method relies on exposure to heptane at a moderate temperature of T = 90 °C in a pressure vessel to detach h-BN impurities from the BNNTs. We showed that X-ray diffraction and Raman spectroscopy are very effective to quantitatively detect the degree of h-BN removal.