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WM-1905: Methods and Compositions for Highly Purified Boron Nitride Nanotubes

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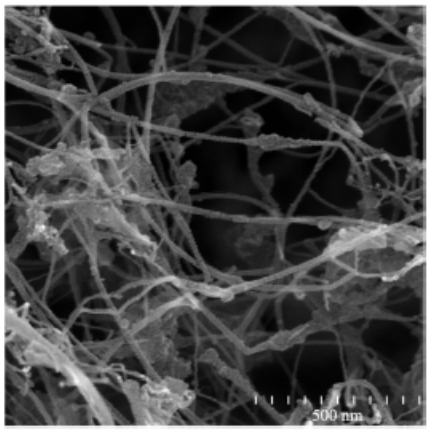
Application: Boron Nitride Nanotubes and Applications Thereof

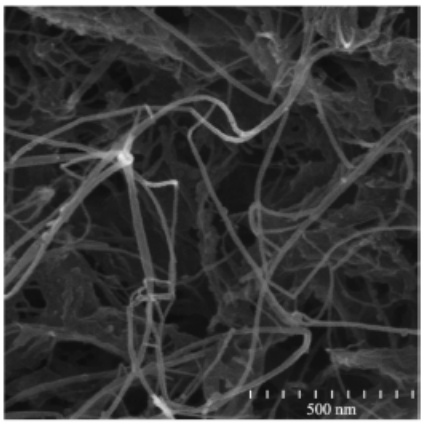
Summary: Due to their unique mechanical and thermal properties, interest in boron nitride nanotubes (BNNT) has grown dramatically over the past two decades. Like carbon nanotubes, BNNTs display exceptional strength. Despite being electrically insulating semiconductors, BNNTs possess high thermal conductivity. They are promising materials for many applications. However, realization of these promising applications has been hindered by significant challenges in BNNT synthesis and purification which has proven far more difficult, for example, than carbon nanotubes (CNTs).

We have developed a low-temperature, non-destructive, hydrocarbon solvent-based method for the purification of BNNTs. This method is particularly effective for efficiently removing hexagonal boron nitride from BNNT. We use this method to achieve BNNTs with a mass ratio of boron nitride nanotube to hexagonal boron nitride of greater than 100, including greater than 1,000.

The process is simple. We mix BNNTs with a suitable hydrocarbon solvent, heat the mixture for a specified period within a specified temperature range near the boiling point of the solvent, and then separate the purified BNNTs.



As-produced BNNT



Purified BNNT

Intellectual Property: Pending United States patent application

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