

News & Comments

Hexagonal Boron Nitride Nanosheets Exfoliated Using the New Approach

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A new mechanical process for controlling the exfoliation of hexagonal boron nitride nanosheets (h-BNNS) known as the “water-icing triggered exfoliation process,” has been described by Chinese researchers.

The Boron nitride nanosheet is a 2D crystalline form of the hexagonal boron nitride, with just a few atomic layers thick, they are similar in their geometry to graphene but differ in their chemical and electronic properties. The honeycomb-like structure of h-BNNSs gives them excellent thermal conductivity, good oxidation resistance, remarkable mechanical strength, a low dielectric constant, excellent lubricity, excellent biocompatibility, and excellent optical properties. And these properties make it very useful for applications like high-performance electronic devices, dielectric substrates, thermal management, lubrication, sensors, catalysts, and sorbents. The development of simple, controllable, and scalable methods to produce high-quality h-BNNSs is therefore imperative.

In the newly published study, Prof. ZHANG Junyan’s group by using efficient reduction of h-BNNS interlayer interaction by rapid volume expansion of water in icing was able to propose a scalable and controllable approach to exfoliate high-quality h-BNNSs from h-BN flakes.

They adjusted a few parameters for successfully achieving this exfoliation process for large quantities of different high-quality h-BNNSs. Their method is environmentally friendly as they exfoliate h-BNNSs with controllable thickness by a rapid water freezing and subsequent ultrasonication process. Its application includes, but is not limited to, polymer additives, thermally conductive fillers, and flame retardants.

KEYWORDS

hexagonal boron nitride nanosheets, scalable and controllable exfoliation, rapid expansion, thermal conductivity, flame retardant, Chemical, China, Chinese, Chinese Academy of Sciences, graphene, hydrogen, Ice, Internet, online, production, research, science, study, Water

