



Materials and Coatings

Exfoliated Hexagonal Boron Nitride

Novel method for exfoliated hexagonal Boron Nitride that is soluble

NASA Langley Research Center has developed a method for exfoliating commercially available hexagonal Boron Nitride (hBN) into nanosheets a few atomic layers thick. Currently hBN has limited use because it is insoluble with limited dispersibility, despite hBN having excellent thermal conductivity and electrical insulation. Langley's novel method provides for exfoliated hBN nanosheets that are soluble or suspendable in a variety of solvents, allowing for their bulk preparation and incorporation into composites, coatings, and films.

BENEFITS

- First method to produce solution-processible exfoliated hBN nanostructures in bulk quantities
- Exfoliated hBN is thermally conductive and electrically insulating
- Simple, cost efficient, and scalable method using commercially available hBN

technology solution

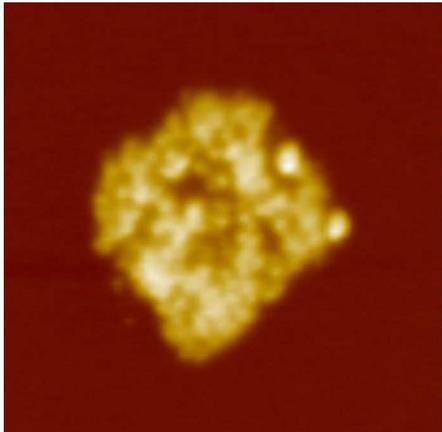


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THE TECHNOLOGY

The invented method involves mechanical breakdown of large hBN particles followed by chemical functionalization to achieve exfoliation of the hBN sheets. The exfoliated h-nanosheets are of mono- or few atomic layers thick, and dispersible (or suspendable, soluble) in common organic solvents and/or water, depending upon the nature of the functionalities. The functionalities can be subsequently removed by thermal treatment, with the hBN nanostructures remaining intact and exfoliated.



Functionalized hBN Sheet

APPLICATIONS

The technology has several potential applications:

- Microelectronics
- Microelectronics
- Advanced composites
- Biomedical

PUBLICATIONS

Patent No: 8,303,922

National Aeronautics and Space Administration

The Technology Gateway

Langley Research Center

Mail Stop 151
Hampton, VA 23681
757-864-1178
LARC-DL-technologygateway@mail.nasa.gov

<http://technology.nasa.gov/>

www.nasa.gov

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