

Methods of Preparing Alkali Metal-intercalated hBN Materials, Resultant Products and Uses Thereof

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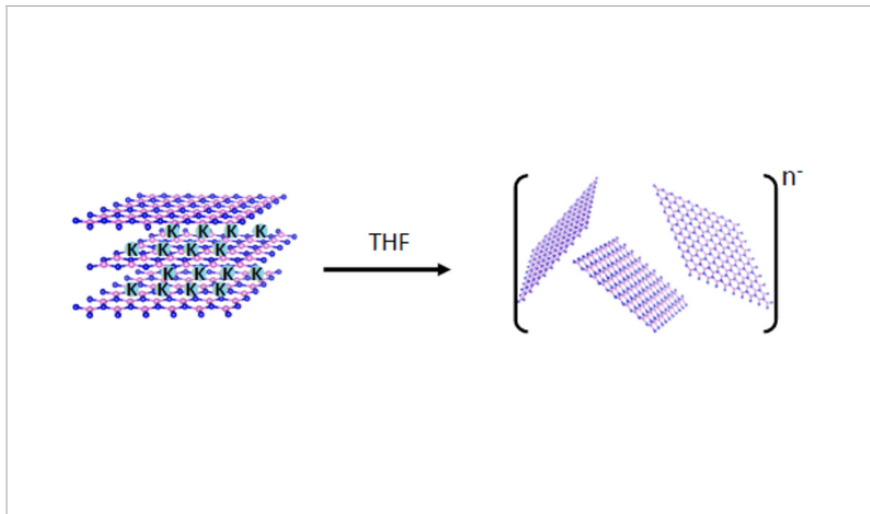


Figure 1. Production of negatively charged hBN sheets from K-intercalated hBN

Technology Summary

The invention covers a large-scale synthesis of alkali metal-intercalated hBN materials from heating and mixing a molten alkali metal with hBN powders. The method enables the efficient characterization of the materials' physical and chemical properties. The method also allows for the production of exfoliated 2-D hBN in solution. The invention further enables the production of 2-D hBN-supported metal and metal oxide nanoparticles having high specific surface area, excellent mechanical properties, and high thermal and electrical conductivities. The nanoparticles can be grafted onto hBN sheets.

Application & Market Utility

A simple and large-scale preparation of alkali metal-intercalated hBN, and the dissolution and/or exfoliation of alkali metal-intercalated hBN had not been demonstrated before. The dispersion of exfoliated negatively charged 2-D hBN will enable the use of a variety of solution-phase functionalization, processing and deposition techniques. These alkali metal-intercalated hBN material have a variety of applications including as a semiconducting material, an electrical material, a superconducting material, a magnetic material as a reducing agent for liquid phase chemical reactions and as a precursor for fully exfoliated 2-D hBN dispersions in solution.

Next Steps

The inventors have disclosed additional patentable inventions enabled by this invention.

TECHNOLOGY READINESS LEVEL

4

Seeking

Licensing | Research

Keywords

- Hexagonal Boron Nitride
- 2-D materials
- Films
- Coatings and membranes

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