

Wurtzite Boron Nitride

Wurtzite boron nitride is a relatively new super abrasive material used in conjunction with detonation. It is the next step in the evolution of boron nitride.

NEW YORK, NEW YORK, USA, June 23, 2022 /EINPresswire.com/ -- [Boron Nitride: The Other White Graphite](#)

[Boron nitride](#) is also known as white graphite due to its similar hexagonal structure and lubricious properties. It is an extremely hard ceramic material and has a polycrystalline structure that provides superior cutting properties and sharpens itself by cutting. The polycrystalline structure also gives the material good thermal conductivity and thermal shock resistance.



Wurtzite Boron Nitride

The polycrystalline structure is a method of chemically connecting crystal masses so that they can all work simultaneously. As a result, the cloth removal percentage and overall level of w-BN are superior to the slicing qualities of other well-known materials.

Physical Properties

Link - <https://borates.today/wurtzite-boron-nitride/>

w-BN – Stronger than Diamond?

As the hardest known material globally, diamond has long been prized for its strength and durability. But new research suggests that there may be materials even stronger than diamonds.

Scientists have calculated that a material called [wurtzite boron nitride](#) has a greater indentation strength than diamond. They also found that another material, lonsdaleite, made up of carbon, is stronger than w-BN (made up of boron and nitrogen atoms) and 58% stronger than diamond.

According to the scientists, the greater strength of w-BN and lonsdaleite is due to the materials'

structural reaction to compression. Under normal compressive pressures, the materials undergo a structural phase transition into stronger structures, preserving volume by turning their atomic bonds.

Researchers further explain that w-BN and lonsdaleite have slight changes in the directional arrangements of their bonds when compared to diamond, which is mainly accountable for one's unique structural reaction.

The compression strength of w-BN and lonsdaleite is due to a mechanism known as bond-flipping. This happens when the atoms in the material rearrange themselves to resist the applied pressure better. The resulting distorted structure is far more powerful than the original, undistorted structure.

This bond-flipping results in an indentation strength of 114 GPa for w-BN, which is significantly higher than diamond (97 GPa). The exact process results in an indentation strength of 152 GPa for lonsdaleite, making it stronger than w-BN.

Many Applications

Due to its plate-shaped particles, wurtzite boron nitride is a component for sintering coarse grit polycrystalline structure powders. These powders are then used to make regular cutting and grinding tools.

With the regular crystal shape particles, the material is ideal for steel polishing applications such as molds and dies.

While w-BN has a similar structure to diamond, it is composed of different atoms. The mineral lonsdaleite, also known as hexagonal diamond, is composed of carbon atoms arranged in parallel, but they can be placed in various shapes. These materials, however, can only be found in microscopic amounts within meteorites.

Also, when too much pressure is applied to lonsdaleite and wurtzite boron nitride via a two-stage shear deformation, their atomic bonds flip, resulting in much stronger materials than the unpressurized substances. Under the same conditions, Lonsdaleite (hexagonal diamond) is 57% more powerful with 152 GPa. With 114 GPa, wurtzite boron nitride is 18% stronger. Diamond, on the other hand, has only 97 GPa for reference.

Even though only minor amounts of w-BN and lonsdaleite exist naturally or are synthesized in the lab, their superior power has not been investigated. The simulation demonstrates that wurtzite boron nitride can resist more than 18% more stress than diamond, and lonsdaleite can resist more than 58% more pressure.

Global Market for Wurtzite Boron Nitride

The global wurtzite boron nitride market is expected to grow significantly in the coming years, owing to its growing applications in various industries. It is a synthetic material with properties similar to diamond and graphite. It is an extremely hard material with applications in resistance materials, antiwear additives, heat shield materials, and others.

A market report by Marketwatch includes a comprehensive analysis of the key players in the market, such as 3M Company, Saint-Gobain, Element Six, Sandvik Hyperion, Tomei Diamond, and Henan Huanghe Whirlwind.

Moreover, the report suggests that the Asia-Pacific region (China, India, Japan, Korea, Southeast Asia, and Western Asia) is expected to be the largest market, followed by Europe, North America, and the Middle East & Africa, and South America.

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