Molecule of the month

B2C CHEMISTRY

Dear Mme / Sir,

Powering Innovation: New Facility for Nanostructured Boron

Through our Chinese partner Volant, we have access to a manufacturer that produces **high-purity, nanostructured elemental boron** using plasma chemistry from **boron trichloride gas**.

The manufacturer is currently planning the construction of a production facility dedicated to the manufacture of nanostructured boron.

However, the company is already producing **boron trichloride gas** in a high-tech industrial park.

In July 2025, we visited the manufacturer in China and were informed about this project, including the construction of the new production facility in the same high-tech industrial park.

The completion of the plant is expected in approximately **two years**.

Small samples can already be sent upon request for academic & R&D purposes.

Potential Applications of Nanostructured Elemental Boron

1. Hydrogen Storage & Energy Materials

- **Hydrogen storage media**: Nanostructured boron and boron-based hydrides (e.g., $LiBH_4$, $NaBH_4$) can

As a business concept B2C-Chemistry GmbH is representing foreign Fine Chemicals producers in Germany and other European countries. Through our partnering companies, we are offering a broad range of valuable raw material and value added intermediates, which are being used in a multitude of applications.

All our partners are experienced in custom manufacturing and deliver from gram – to kilogram – to multi-ton range. Please find the list of technologies being used which gives you a flavor of their capabilities.

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store large amounts of hydrogen with improved kinetics when in nanoscale form.

- **Solid-state hydrogen carriers** for fuel cells and clean energy systems.
- **Catalysts or additives** in hydrogen release and uptake reactions.

2. Advanced Energy Systems & Batteries

- **Lithium-ion and next-gen batteries**: Boron nanostructures can enhance electrode stability, conductivity, and thermal resistance.
- **Solid electrolytes**: Boron-containing nanomaterials contribute to ionic conductivity and safety.
- **High-energy storage devices**: Potential use in supercapacitors and hybrid storage systems.

3. High-Performance Materials & Composites

- **Lightweight, high-strength composites** for aerospace and defense applications.
- **Boron fibers and coatings** with exceptional hardness, wear resistance, and thermal stability.
- **Thermal management materials** in electronics and high-power devices.

4. Electronics & Semiconductors

- **Boron-based nanostructures** in semiconductors for microelectronics.
- **Dielectric layers and dopants** in high-performance transistors.
- **Nano-additives** to improve optical, electronic, or thermal properties of device materials.

5. Optics & Photonics

- **Boron nitride (from boron precursors)** for UV optics, protective coatings, and photonics.

- **Stabilization of laser dyes** and advanced optical materials.
- **Potential role in nonlinear optical materials** due to unique electronic structure at the nanoscale.

6. Defense & Space Technologies

- **Rocket propellants** and **solid fuels**: Boron has one of the highest volumetric energy densities of all elements.
- **Nanostructured boron** enhances ignition properties and combustion efficiency.
- **Radiation shielding** in nuclear and space environments due to neutron absorption capacity.

7. Medical & Healthcare (Emerging Research)

- **Boron Neutron Capture Therapy (BNCT):** Boron delivery agents for targeted cancer therapy, with nanoscale boron improving biodistribution.
- **Drug delivery systems**: Functionalized boron nanoparticles as carriers.