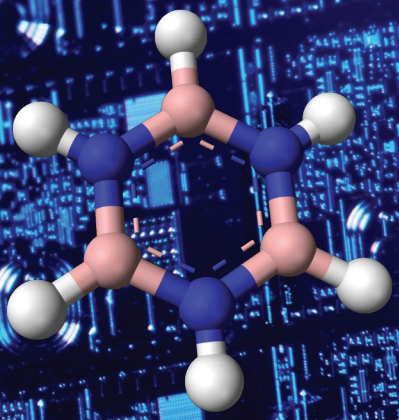
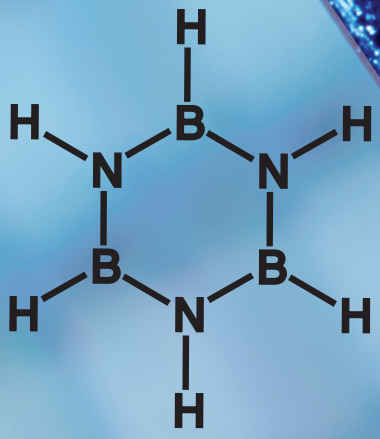
Gelest

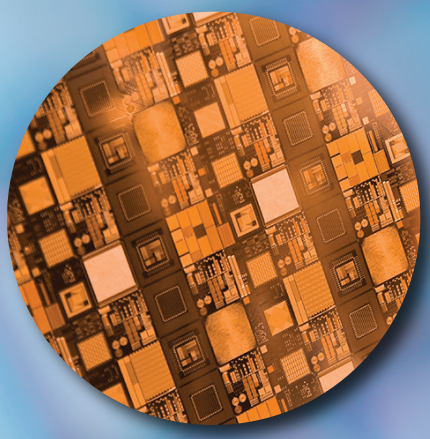
Enabling Your Technology

BORAZINE

the simple solution for boron nitride™







- Preferred precursor for hexagonal boron nitride (h-BN) films
- No carbon by-products upon formation of boron nitride

Forms h-BN films with:

- Wide band gap (5.955 eV)[1]
- High Thermal and Chemical Stability
- High Electrical Resistivity, Thermal Conductivity, Thermal Shock Resistance

Also available: Trimethylborazine

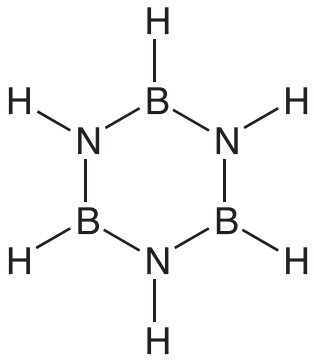
Borazine

Gelest has a long history of producing borazine and is the leading supplier of borazine worldwide. Borazine is the preferred precursor for hexagonal boron nitride (h-BN) films as it has the correct B-N ratio, a B-N ring structure, and no carbon by-products upon formation of boron nitride. Hexagonal boron nitride is a material of great interest due to its wide band gap (5.955 eV)[1], high thermal and chemical stability, high electrical resistivity, high thermal conductivity, and high thermal shock resistance. Two dimensional (2D) h-BN films can be grown by chemical vapor deposition (CVD) of borazine on a copper or nickel foil substrate.[2,3,4]

Applications of Hexagonal Boron Nitride Produced from Borazine

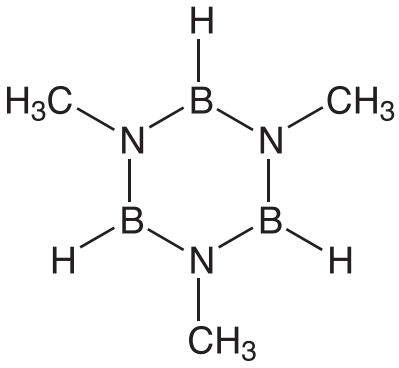
Hexagonal boron nitride films produced by CVD of borazine have been explored in several applications including semiconductors, optoelectronics, and high temperature ceramic coatings among others.[5] Jang, et al. have demonstrated the use of h-BN films as gate dielectrics and measured the dielectric contstant of h-BN films of varying thicknesses between gold substrates on a SiO_2/Si substrate. The dielectric constant was 3-4 and was independent of film thickness (1.2 nm – 30 nm).[4] Separately, Bao, et al. have investigated the heat dissipation capacity of h-BN films for use as lateral heat spreaders in electrically insulating packaging applications. Single layer films grown by CVD on a SiO_2/Si substrate showed better cooling efficiency compared to micron films prepared by dispersion of boron nitride powder.[6,7]

Properties of Borazine and Trimethylborazine



Borazine

Product Code: INBO009
Boiling point: 55°C / 760 mm Hg
Melting point: -58°C
Density: 0.81 g/mL



1,3,5-Trimethylborazine

Product Code: OMBO061
Boiling point: 133°C / 760 mm Hg
Melting point: -7°C
Density: 0.888 g/mL

- **Packaged in stainless steel bubbler or cylinder**
- **Custom packaging available including in your cylinder or bubbler**
- **Contact Gelest to request custom synthesis of other borazine derivatives**

Stainless Steel Bubblers

Stainless Steel Bulk Cylinders

References

(1) Cassabois, G. et al., *Nature Photonics 2016*, 10, 262-266.
(2) Gibb, A.L. et al., *Microscopy and Microanalysis 2014*, 20, 1770-1771.
(3) Wu, Q.W. et al., *Nanoscale 2015*, 7, 7574-7579.
(4) Jang, S.K. et al., *Scientific Reports 2016*, 6:30449, 1-9.
(5) Bonifazi, D. et al., *Chem. Commun. 2015*, 51, 15222-15236.
(6) Bao, J. et al., *J. Phys. D:Appl. Phys. 2016*, 49 (26), 265501.
(7) Bao, J. et al., *Electron. Mater. Lett. 2016*, 12 (1), 1-16.

For additional information on Gelest's Borazine and other organometallic materials or to inquire on how we may assist in *Enabling Your Technology*, please contact:

Gelest

Enabling Your Technology

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