

# BORON

# B

**Atomic number**  
5

**Atomic weight**  
10.811

**CAS number**  
7440-42-8

**Boiling point**  
2550°C

**Melting point**  
2079°C

**Specific gravity (20°C)**  
2.34-2.37

**Crystal form**  
Rhombohedral

**Electrical resistivity (20°C)**  
 $1.5 \times 10^{12} \mu\Omega \cdot \text{cm}$

**Enthalpy of melting**  
50.2kJ/mol

**Enthalpy of evaporation**  
506kJ/mol

**Ionization potential**  
(spectral) 8.211eV (I)  
25.154eV (II)  
(aqueous) 0.89V (+3)

**Oxidation states**  
0, 3

**Electronegativity, Pauling**  
2.0

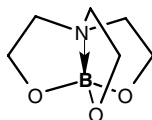
**Specific heat (25°C)**  
0.245 cal/g K

**Thermal conductivity (25°C)**  
27.4w/m K

name	MW	bp/mm (mp)	D <sub>4</sub> <sup>20</sup>	n <sub>D</sub> <sup>20</sup>
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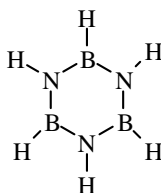
## COMPOUNDS

CATALYSIS

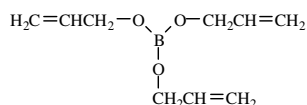


AKB153.8 BORATRANE TRIETHANOLAMINEBORATE	156.98	(235-7°)mp		
crosslinker for epoxy resins in combination w/pyrocatechol <sup>1</sup> . 1. J. Polym. Mater., 7, 167				
[15277-97-1] TSCA HMIS 2-1-0-X	25g/\$20.00		100g/\$65.00	

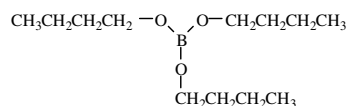
DIELECTRIC CERAMIC



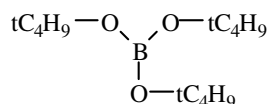
INB0009 BORAZINE H <sub>6</sub> N <sub>3</sub> B <sub>3</sub>	80.50	55°		
potential boron dopant source used as a precursor for boron nitride <sup>1</sup> . 1. Fazan et al, Chem. Mat., 7, 1942, 1995				
HYDROLYTIC SENSITIVITY: 9 reacts extremely rapidly with moisture and oxygen may be pyrophoric- glove box or sealed system required				
[6569-51-3] HMIS: 4-4-2-X	store<5°	50g/\$640.00 + cylinder or bubbler		



AKB154 BORON ALLYLOXIDE C <sub>9</sub> H <sub>15</sub> O <sub>3</sub> B	182.03	72°/12	0.919	1.4270
LACHRYMATOR viscosity, 23°: 0.9cSt catalysis with Pd(PPh <sub>3</sub> ) <sub>4</sub> affords allylic alkylation of carbon nucleophiles <sup>1</sup> . 1. X. Liu, J. Orgmet. Chem., 344, 109, 1988				
HYDROLYTIC SENSITIVITY: 7 B-OR reacts slowly with water/moisture				
[1693-71-6] HMIS: 3-3-1-X		25g/\$69.00		



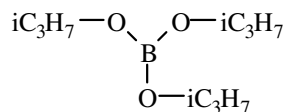
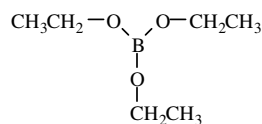
AKB155 BORON n-BUTOXIDE TRIBUTYLBORATE C <sub>12</sub> H <sub>27</sub> O <sub>3</sub> B	230.16	230-5° (-70°)mp	0.853	1.4100
ΔHform: -292 kcal/mole viscosity, 21.4°: 2.0 cSt used in sol-gel prep of Li <sub>2</sub> B <sub>4</sub> O <sub>7</sub> w/ potential for surface acoustical wave (SAW) devices <sup>1</sup> . 1. T. Yoko et al, in Sol-Gel Optics ed by J. Mackenzie SPIE Proc. 1328, 416, 1990				
[688-74-4] TSCA HMIS: 2-2-1-X	100g/\$14.00		1.5kg/\$128.00	



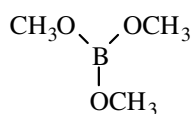
AKB156 BORON t-BUTOXIDE C <sub>12</sub> H <sub>27</sub> O <sub>3</sub> B	230.16	101°/74 (18-9°)mp	0.811	1.3890
flashpoint: 29°C(85°F)				
[7397-43-5] HMIS: 2-3-1-X	25g/\$48.00		100g/\$152.00	

name	MW	bp/mm (mp)	D <sub>4</sub> <sup>20</sup>	n <sub>D</sub> <sup>20</sup>
AKB156.2 BORON ETHOXIDE C <sub>6</sub> H <sub>15</sub> O <sub>3</sub> B	145.99	117-8° (-85°)mp flashpoint: 11°C(52°F)	0.858	1.3740
forms azeotrope with ethanol CVD precursor for boron modified SiO <sub>2</sub> in microelectronics intermediate for organic-modified borosiloxanes <sup>1</sup> . 1. G. Sorar, et al, Chem. Mater., 11, 910, 1999 [150-46-9] TSCA HMIS: 2-4-1-X 100g/\$24.00 500g/\$96.00				
AKB156.5 BORON ISOPROPOXIDE C <sub>9</sub> H <sub>21</sub> O <sub>3</sub> B	188.08	139-41° TOXICITY- oral mouse, LD50: 2500mg/kg flashpoint: 28°C( 82°F)	0.815	1.3760
vapor pressure, 75°: 76mm viscosity: 1.03 cSt undergoes selective allylation w/ Grignards to form boronic esters <sup>1</sup> . $n\text{C}_6\text{H}_{13}\text{---}\text{C}\equiv\text{C---Li} \xrightarrow[\text{DME}]{\text{B}(\text{O}^i\text{Pr})_3} \left[ n\text{C}_6\text{H}_{13}\text{---}\text{C}\equiv\text{C---B}(\text{O}^i\text{Pr})_3 \right] \text{Li}^+ \xrightarrow[\text{DME, THF, } \Delta]{\text{Pd}(\text{PPh}_3)_4, \text{C}_6\text{H}_5\text{Br}} n\text{C}_6\text{H}_{13}\text{---}\text{C}\equiv\text{C---C}_6\text{H}_5$ 1. T. Cole et al, Organomet. 11, 652, 1992 [5419-55-6] TSCA HMIS: 2-4-1-X 25g/\$19.00 100g/\$72.00				
AKB157 BORON METHOXIDE TRIMETHYL BORATE C <sub>3</sub> H <sub>9</sub> O <sub>3</sub> B	103.91	68-9° (-29°)mp TOXICITY- oral rat, LD50: 7910mg/kg flashpoint: -1°C(30°F)	0.915	1.3568
vapor pressure, 25°: 141.3mm viscosity: 0.4 cSt forms doped glasses for laser oscillators and optical memory devices <sup>1</sup> . forms borophosphosilicate glasses by CVD <sup>2</sup> . reagent for derivatizing carbohydrates for GC analysis <sup>3</sup> . 1. Jpn. Kokkai Tokkyo Koho JP 04,193,722, 1992; CA 117:218481p 2. S. Rojas et al, J. Vac Sci. Technol., B, 10, 633, 1992 3. V. Reinhold et al, Carbohydr. Res., 37, 203, 1974 HYDROLYTIC SENSITIVITY: 7 reacts slowly with moisture/water [121-43-7] TSCA HMIS: 2-4-1-X 25g/\$10.00 2kg/\$46.00				
AKB157.1 BORON METHOXIDE, 70% in methanol TRIMETHYL BORATE azeotropic mixture	103.91	54-7° flashpoint: -8°C(16°F)	0.883	1.3472
vapor pressure, 25°: 205.5mm gas flux for brazing <sup>1</sup> . 1. A. Phillips, "Welding Handbook", American Welding Soc. 1959. [121-43-7] TSCA HMIS: 2-4-1-X 100g/\$12.00 2kg/\$36.00				
AKB158 BORON METHOXYETHOXIDE C <sub>9</sub> H <sub>21</sub> O <sub>6</sub> B	236.07	123-5°/1.5 flashpoint: 113°C(235°F)	1.029 <sup>25</sup>	1.4138 <sup>25</sup>
viscosity, 25°: 3 cSt [98958-21-5] HMIS 3-2-1-X 25g/\$18.00 100g/\$59.00				
AKB158.5 BORON n-PROPOXIDE C <sub>9</sub> H <sub>21</sub> O <sub>3</sub> B	188.08	175°	0.857	
HYDROLYTIC SENSITIVITY: 7 reacts slowly with moisture/water [688-71-1] TSCA HMIS: 2-3-1-X 100g/\$14.00 500g/\$56.00				
INB0060 BORON TRIFLUORIDE ETHERATE BF <sub>3</sub> • C <sub>4</sub> H <sub>10</sub> O	141.94	126° (-58°)mp flashpoint: 48°C(118°F)	1.120	1.3480
catalyst for the synthesis of polyols HYDROLYTIC SENSITIVITY: 7 reacts slowly with moisture/water [109-63-7] TSCA HMIS: 4-3-1-X 25g/\$15.00 750g/\$48.00				
SIT8718.0 BORON TRIMETHYLSILOXIDE TRIS(TRIMETHYLSILOXY)BORON C <sub>9</sub> H <sub>27</sub> BO <sub>3</sub> Si <sub>3</sub>	273.38	184° (-35°)mp flashpoint: 42°C(109°F)	0.825	1.3860
ΔHvap: 10.1kcal/mole source for borosilicate glass by CVD at 800° <sup>1</sup> . 1. H. Treichel et al, CA 109, 241901u; J. Phys., Colloq (C4 Solid State Res. Conf) 1988 HYDROLYTIC SENSITIVITY: 7 reacts slowly with moisture/water [4325-85-3] TSCA HMIS: 2-3-1-X 25g/\$34.00 100g/\$102.00				

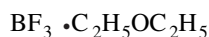
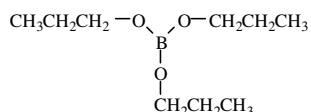
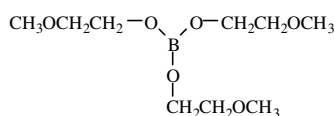
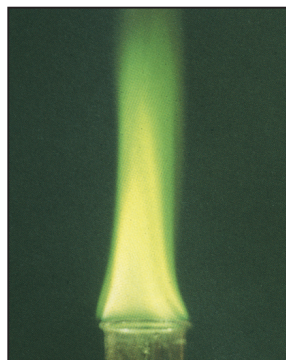
DIELECTRIC CERAMIC



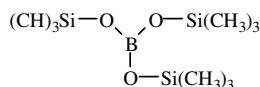
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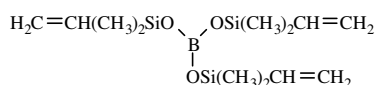


Boron Methoxide Flame

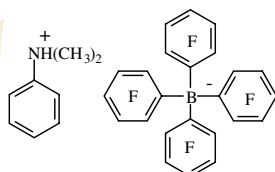


DIELECTRIC CERAMIC

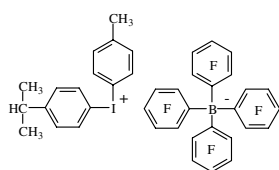




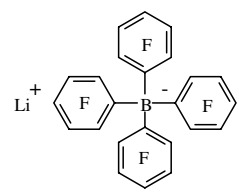
CATALYSIS



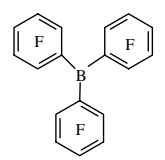
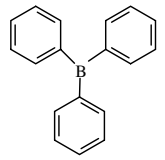
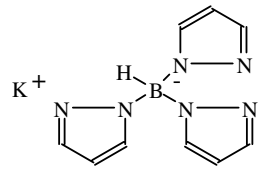
LIGHT INTERACTION



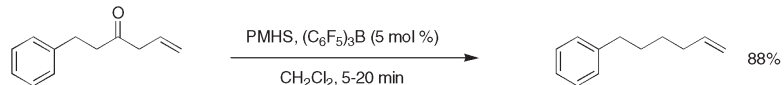
LIGHT INTERACTION



CATALYSIS



name	MW	bp/mm (mp)	D <sub>4</sub> <sup>20</sup>	n <sub>D</sub> <sup>20</sup>
AKB159.5 BORON VINYL DIMETHYLSILOXIDE C <sub>12</sub> H <sub>27</sub> O <sub>3</sub> Si <sub>3</sub> B [383189-04-6] HMIS: 2-2-1-X	314.41	78°/15	0.872	1.4163
OMBO028 DIMETHYLANILINIUM TETRAKIS(PENTA- FLUOROPHENYL) BORATE C <sub>33</sub> H <sub>12</sub> F <sub>20</sub> NB cocatalyst in metallocene based olefin polymerizations <sup>1,2</sup> . catalyst for polymerization of cyclosiloxanes <sup>3</sup> . 1. P. Biagini et al, EP 0 667 357 A1 2. P. Hanna et al, US Pat, 5,523,385, 1996 3. A. Grzelka et al, J. Inorg. Orgmet. Poly, 14, 101, 2004 HYDROLYTIC SENSITIVITY: 5 forms reversible hydrate	813.23 hygroscopic			
[118612-00-3] HMIS: 3-1-1-X		2.5g/\$184.00		
OMBO037 (p-ISOPROPYLPHENYL)(p-METHYLPHENYL)- IODONIUM TETRAKIS(PENTAFLUOROPHENYL) BORATE C <sub>40</sub> H <sub>18</sub> BF <sub>20</sub> I UVmax: 235nm TOXICITY- oral rat, LD50: 1500-2000mg/kg decomposes>235° soluble: toluene, THF, methanol UV initiator for cycloaliphatic epoxide functionalized silicones HYDROLYTIC SENSITIVITY: 4 no reaction with water under neutral conditions	1015.7	(120-133°)mp		
[178233-72-2] TSCA HMIS: 2-1-0-X	5.0g/\$48.00	25g/\$192.00		
OMBO039 LITHIUM TETRAKIS(PENTAFLUOROPHENYL)- BORATE DIETHYLETHER COMPLEX C <sub>24</sub> F <sub>20</sub> BLi • 2.5(C <sub>4</sub> H <sub>10</sub> O) intermediate for olefin polymerization catalysts HYDROLYTIC SENSITIVITY: 8 reacts rapidly with moisture/water	685.97/760.09	(120-4°)mp-d.		
[2797-28-6] HMIS: 2-2-1-X		5.0g/\$196.00		
AKB156.4 DIPHENYLBORANE 8-HYDROXYQUINOLINATE BPh <sub>2</sub> q C <sub>21</sub> H <sub>16</sub> NOB color: yellow forms electroluminescent devices emitting at 495-500nm <sup>1</sup> . 1. Q. Wu et al, Chem. Mater., 12, 79, 2000 HYDROLYTIC SENSITIVITY: 4 no reaction with water under neutral conditions	309.18	100°/0.01mm-sub (203-5°)mp		
[29190-60-1] HMIS: 2-3-1-X		5.0g/\$190.00		
OMBO073 POTASSIUM HYDROTRIS(1-PYRAZOLATO)- BORATE, hydrate C <sub>9</sub> H <sub>10</sub> BN <sub>6</sub> K • H <sub>2</sub> O forms a wide range of transition metal complexes active in olefin metathesis HYDROLYTIC SENSITIVITY: 4 no reaction with water under neutral conditions	252.13	(185-9°)mp		
[18583-60-3] HMIS: 2-1-0-X		5.0g/\$190.00		
OMBO078 TRIPHENYLBORANE C <sub>18</sub> H <sub>15</sub> B HYDROLYTIC SENSITIVITY: 4 no reaction with water under neutral conditions	242.13	208°/14 (147°)mp		
[960-71-4] HMIS: 3-2-1-X		10g/\$94.00		
OMBO087 TRIS(PENTAFLUOROPHENYL)BORON C <sub>18</sub> F <sub>15</sub> B catalyzes reduction of carbonyls <sup>1</sup> .	511.99	(126-131°)mp		
[1109-15-5] HMIS: 3-1-0-X	1.0g/\$45.00	5.0g/\$180.00		



1. D. Parks et al, J. Org. Chem., 65, 3090, 2000  
HYDROLYTIC SENSITIVITY: 4 no reaction with water under neutral conditions