製品データシート

Optibor®

H_3BO_3
オルトホウ酸
ホウ酸
工業用グレード: 粒状、粉末状、エクストラファインパウダー
薬局方グレード (NF): 粒状・粉末状
特級グレード (SQ): 粒状
欧州薬局方グレード (EP): 粒状・粉末状
高純度グレード (HP)

CAS/TSCA 番号 10043-35-3

Optibor® は 純粋且つ多機能な、酸化ホウ素 (B_2O_3)供給源です。五水ホウ砂と共に、工業用ホウ素化合物として幅広く使用されています。

Optibor (H_3BO_3) は理論上は酸化ホウ素と水から成っています。結晶は白色で、粒状もしくは粉末状で使用されます。どちらの形状でも室温状態下ではで安定しており、流動性が良く、空気・機械による搬送も容易に行えます。溶液では、弱酸性を示します。

用途と利点について

ラスの		溶　温度		ラス　度		薬品性
A		X	X	X	X	
	X	X	X	X		X
	X	X	X	X	X	X

Mnrg`mp .K/

>.K/

Mnrg`mp .K/

Mnrg`mp

>.K/

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Flame retardancy
Incorporated into cellulose materials, borates change the oxidation reactions and promote the formation of 'char,' thereby inhibiting combustion. *Optibor*, alone or in combination with borax, are particularly effective in reducing the flammability of cellulose insulation, wood composites, and the cotton batting used in mattresses.

Metallurgy
Optibor prevents the oxidation of metal surfaces in welding, brazing, or soldering. It is also used as a source of boron for strengthening metal alloys and steel.

Corrosion inhibition
Optibor is incorporated in many aqueous and non-aqueous systems requiring corrosion inhibition, lubrication, or thermal oxidative stabilization. *Optibor* is also used in the manufacture of lubricants, brake fluids, metalworking fluids, water treatment chemicals, and fuel additives.

Adhesives
As part of the starch adhesive formulation for corrugated paper and paperboard, and as a peptizing agent in the manufacture of casein-based and dextrin-based adhesives, *Optibor* greatly improves the tack and green strength of the adhesive by crosslinking conjugated hydroxyl groups.

Personal care products
EP and NF grade *Optibor* is used personal care applications including cosmetics, toiletries, and pharmaceuticals. It is used in conjunction with sodium borates for pH buffering, and as a crosslinking agent to emulsify waxes and other paraffins.

Nuclear energy
Being a highly effective absorber of thermal neutrons, the boron-10 isotope is essential to the safety and control systems of nuclear power stations. *Optibor* SQ and HP grades are made for the nuclear industry, and can be isotopically enriched to increase the available proportion of boron-10.

Chemical reactions
In the manufacturing of nylon intermediates, *Optibor* catalyzes the oxidation of hydrocarbons and increases the yield of alcohols by forming esters that prevent further oxidation of hydroxyl groups to ketones and carboxylic acids.

They are also used in preparing various important industrial products such as boron halides, borohydride, fluoborates, metallic borates, borate esters, and boron containing ceramics.

Some other applications
- Dye stabilization
- Electroplating
- Electrolytic capacitors
- Leather processing and finishing
- Sand-casting (magnesium)
- Textile finishing
- Paints

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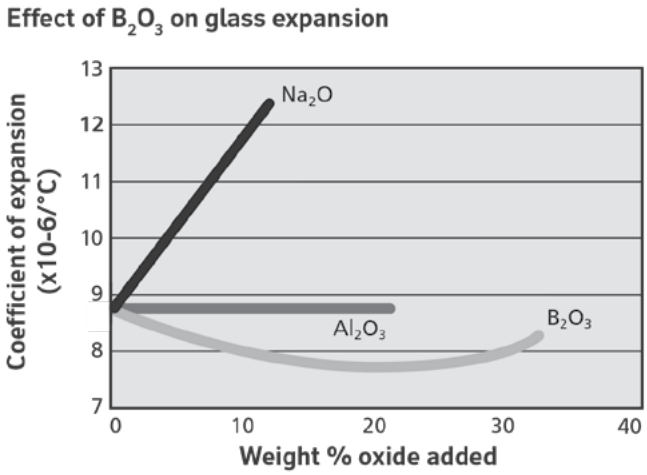

Reduction in linear coefficient of expansion in glass when silica is replaced proportionately by boric acid. This facilitates "thermal fit" in ceramic glazes and heat resistance in borosilicate glass.

Source: *Glass* by Horst Scholze 1991

Chemical and physical properties

When heated above 100°C (212°F) in the open, *Optibor* boric acids gradually lose water first changing to metaboric acid, HBO_2, of which three monotropic forms exist. These have melting points respectively of 176°C (348.8°F), 201°C (393.8°F), and 236°C (456.8°F). Dehydration stops at the composition HBO_2 unless the time of heating is extended or the temperature raised above 150°C (302°F). On continued heating and at higher temperatures, all water is removed leaving the anhydrous oxide, B_2O_3, the crystalline form of which melts at 450°C (842°F). The amorphous form has no definite melting point, softening at about 325°C (617°F) and becoming fully fluid at about 500°C (932°F).

Stability

Optibor is a stable crystalline product that does not change chemically under normal storage conditions. Wide fluctuations in temperature and humidity can cause recrystallization at particle contact points, resulting in caking. Care should therefore be taken to avoid such fluctuations during storage of the product. Also, it is, of course, essential to maintain the integrity of the packaging.

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Characteristics	
Molecular weight	61.83 g/mol
Specific gravity	1.50
Melting point	171°C (340°F)
Heat of solution (absorbed) @18°C	364,000 J/kg (156.5 BTU/lb)
Bulk density	55 lb/ft^3 (881 kg/m^3)

Theoretical chemical composition	
B_2O_3	56.30%
H_2O	43.70%

Solubility in water	
Temperature °C (°F)	Boric acid % by weight in saturated solution
0 (32)	2.52
5 (42)	2.98
10 (50)	3.49
15 (59)	4.08
20 (68)	4.72
25 (77)	5.46
30 (86)	6.23
35 (95)	7.12
40 (104)	8.08
45 (113)	9.12
50 (122)	10.27
55 (131)	11.55
60 (140)	12.97
65 (149)	14.42
70 (158)	15.75
75 (167)	17.41
80 (176)	19.10
85 (185)	21.01
90 (194)	23.27
95 (203)	25.22
100 (212)	27.53
103.3 (217.9)*	29.27

*Boiling point of solution

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Solubility in other solvents		
Organic solvent	**Temp °C (°F)**	**Boric acid % by weight in saturated solution**
Glycerol (98.5%)	20 (68)	19.90
Propylene glycol	20 (68)	21.10
Ethylene glycol	25 (77)	18.50
Diethylene glycol	25 (77)	13.60
Ethyl acetate	25 (77)	1.50
Acetone	25 (77)	0.60
Glacial acetic acid	30 (86)	6.30
Methanol	25 (77)	21.96
Ethanol	25 (77)	11.96
1-Propanol	25 (77)	7.40
1-Butanol	25 (77)	5.28
2-Methyl-1-butanol	25 (77)	4.33

Hydrogen ion concentration Aqueous solutions of *Optibor* are mildly acidic; the pH decreasing with increasing concentration	
%H_3BO_3 by weight of solution	**pH @ 20°C (68°F)**
0.1	6.1
0.5	5.6
1.0	5.1
2.0	4.5
3.0	4.2
4.0	3.9
4.72 (saturated)	3.7

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