Boric acid:

Preparation:

1) $Na_2B_4O_7 + H_2SO_4 + 5H_2O \longrightarrow Na_2SO_4 + H_3BO_3$

A hot conc. solution of borax is treated with calculated amount of conc. H_2SO_4. When the solution is cooled crystals of H_3BO_3 are obtained.

2) $Ca_2B_6O_{11} + 2SO_2 + 11H_2O \longrightarrow 2Ca(HSO_3)_2 + 6H_3BO_3$

When mineral powder of colemanite ~~pass~~ mixed with boiling water and SO_2 is passed suspension of H_3BO_3 is formed.

Properties:

1. on heating

i) $H_3BO_3 \xrightarrow{100^\circ C} HBO_2 + H_2O$

ii) $4HBO_2 \xrightarrow{160^\circ C} H_2B_4O_7 + H_2O$

iii) $H_2B_4O_7 \xrightarrow[\text{heating}]{\text{Strong}} B_2O_3 + H_2O$

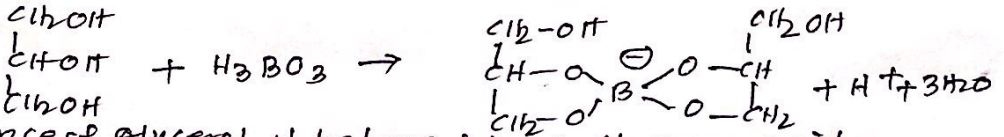
2. Test for H_3BO_3:

$H_3BO_3 + CH_3OH \longrightarrow B(OCH_3)_3 + 3H_2O$

Trimethyl borate burns with green edged flame

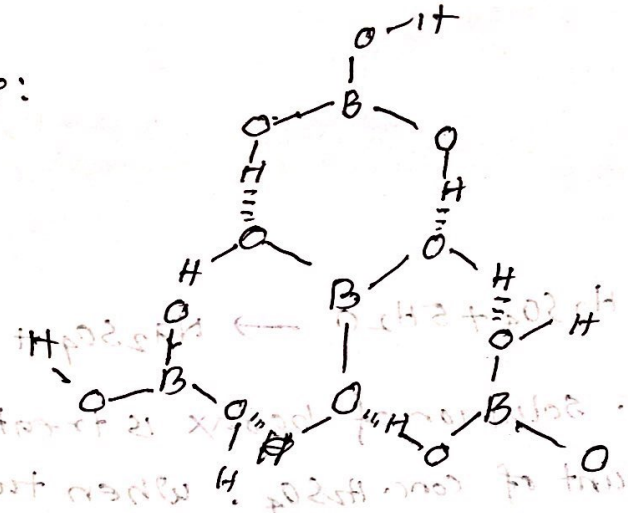
3. $H_3BO_3 + 3CaF_2 + 3H_2SO_4 \longrightarrow 2CaSO_4 + 2BF_3 + 6H_2O$

4. Reaction with 1,2-diol (cis):



In presence of glycerol H behave like a strong acid.

Structure:



octacyclic ring

Boron nitride, BN

1) $Na_2B_4O_7 + NH_4Cl \longrightarrow 2BN + 2NaCl + B_2O_3 + 4H_2O$

2) $B_2O_3 + Hg(CN)_2 \longrightarrow 2BN + CO + CO_2 + Hg$

3) $BCl_3 + 6NH_3 \longrightarrow B(NH_2)_3 + 3NH_4Cl$

$2B(NH_2)_3 \xrightarrow[\Delta]{} B_2(NH)_2 + 3NH_3$

$B_2(NH)_3 \longrightarrow 2BN + NH_3$

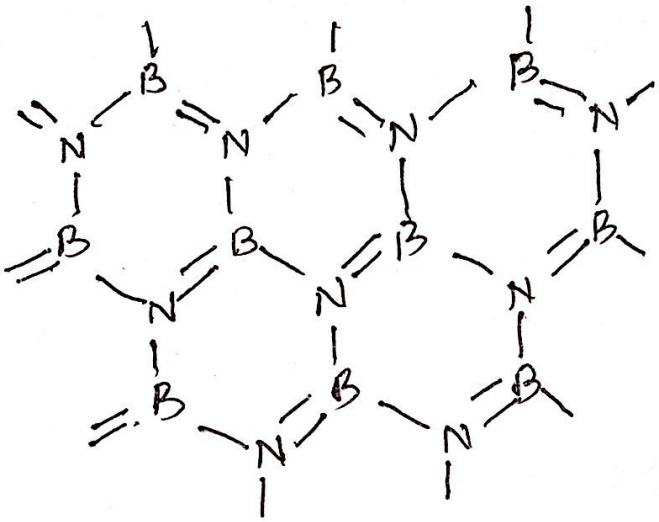
Properties:

1) $BN + H_2O \longrightarrow B_2O_3 + NH_3$

2) $BN + 4HF \longrightarrow NH_4BF_4$

3) $K_2CO_3 + BN \longrightarrow KCNO + KBO_2$

Structure of BN: The BN has almost same structure of graphite with sheets made up of hexagonal rings of alternate B and N joined together.



Boron nitride