

6.6: Trends for the Oxides of the Group 13 Elements

All of the Group 13 elements form a trivalent oxide (M_2O_3). The chemical properties of the oxides follow the trend acidic to basic going down the Group (Table 6.6.1). The physical properties are consistent with the electronegativities and covalent character in the M-O bonds. Thallium oxide is unique in that it decomposes above 100 °C to yield the thallium(I) oxide, Tl_2O . The other oxides are all stable to high temperatures.

Table 6.6.1: Properties of the Group 13 oxides.

Oxide	Color	Chemical property	Melting point (°C)
B_2O_3	White/colorless	Weak acid	450 (trigonal), 510 (tetrahedral)
Al_2O_3	White/colorless	Amphoteric	2072 (α)
Ga_2O_3	White/colorless	Amphoteric	1900 (α), 1725 (β)
In_2O_3	Yellow	Weakly basic	1910
Tl_2O_3	Brown-black	Basic, oxidizing	100 (decomposes)

Bibliography

- G. E. Jellison, Jr., L. W. Panek, P. J. Bray, and G. B. Rouse, Jr., *J. Chem. Phys.*, 1977, **66**, 802.

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