>>**Entry Name: Aluminium borides**

CAS Registry Number: 37367-77-4
Related CAS Registry Numbers(s): 12250-42-9

Molecular Formula: [AlB]
General Statement: At least four phases known
Use/Importance: AlB_2, AlB_{12} are commercially available

>>**Variant: Aluminium boride (AlB_2),** 9Cl, 8Cl
Synonym(s): Aluminium diboride

CAS Registry Number: 12041-50-8
Molecular Formula: AlB_2
Molecular Weight: 48.604
Accurate Mass: 49.000149
Percentage Composition: Al 55.51%; B 44.49%
General Statement: Struct. has hexagonal nets of B atoms each surrounded by 6 Al at corners of trigonal prisms
Source/Synthesis: Synth. from H_3BO_3, (or KBF_4) + Al at 800-1300° or Al + B_2O_3/KCl at 1200°
Physical Description: Black cryst. platelets with metallic lustre, or needles (hexagonal stars)
Melting Point: Mp 1350°
Other Data: Metallic conductor: 333 Ω^{-1} m^{-1}. When finely divided, begins to oxidise in air at 700-800°. Dec. at *ca.* 1350° → AlB_{12} + B. Reacts slowly with H_2O, aq. HCl
Aldrich: 39961-2

>>**Variant: Aluminium boride (AlB_4)**

CAS Registry Number: 111050-36-3

Molecular Formula: AlB_4
Molecular Weight: 70.226
Accurate Mass: 71.018759
Percentage Composition: Al 38.42%; B 61.58%
General Statement: Struct. has chains of B_6 octahedra joined by B_2 with Al in tunnel-like cavities
Physical Description: Dark solid, not well-characterised

>>**Variant: Aluminium boride (AlB_{12}),** 9Cl, 8Cl
Synonym(s): Aluminium dodecaboride

CAS Registry Number: 12041-54-2

Molecular Formula: AlB_{12}
Molecular Weight: 156.713
Accurate Mass: 159.093199
Percentage Composition: Al 17.22%; B 82.78%
General Statement: Exists in α (tetragonal) and γ (orthorhombic) modifications. "β-Phase" contains C. α-Form contains 3-D array of B_{12} icosahedra, B_{19} units and single B atoms. The B_{19} units are twinned icosahedra with triangular plane and vacant apex on each side. B sites in ratio 2:1:1. Al atoms distributed statistically
Source/Synthesis: Synth. from Al + $Na_4B_4O_7$ at 1000-1100°; or Al + B at 1100-1200°
Use/Importance: Employed in manuf. of lightweight armour plate; also catalyst for org. reactions
Physical Description: Yellow to brown acicular prisms or tetragonal bipyramids
Melting Point: Mp 2070°
Other Data: When finely divided, begins to oxidise in air at *ca.* 650°. Dec. to AlB_2 at 1350-1450°. α-form stable 1000-2000°. Band gap E_g 1.8-1.9 eV
Aldrich: 39960-4

References: