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Title: Superconductivity in Borides

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Abstract: The discovery of a novel superconducting state in MgB₂ has led to an interest in borides. We have studied several boride compounds to gain greater insight into this new phenomenon. Polycrystalline samples of OsB₂ and RuB₂ were grown in a tetra arc furnace. X-Ray Diffraction (XRD) data shows that OsB₂ crystallizes in orthorhombic structure at room temperature. They contain alternate boron and osmium layers stacked along c-axis. The boron layers in MgB₂ are flat whereas that in OsB₂ has a chair-like structure. Electrical resistivity measurements were carried out to study superconducting properties of OsB₂. It was observed that OsB₂ becomes superconducting below T_c = 2.1 K. The resistivity measurement of RuB₂ shows that it becomes superconducting below 1.6 K. LuRuB₂ was found to be superconducting at around 10.98 K. Pressure studies on the sample showed that the critical temperature decreases with increasing pressure.

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