Gahnite

\( \text{ZnAl}_2\text{O}_4 \)

Crystal Data: Cubic. \text{Point Group: } 4/m\overline{3}m. Typically octahedra, rarely as dodecahedra, may be modified by \{100\} or \{011\}, to 12 cm; also as exsolation lamellae in other minerals; granular, massive. \text{Twinning: } On \{111\} as both twin and composition plane, common.

Physical Properties: \text{Cleavage: } Parting \{111\}, indistinct. \text{Fracture: } Conchoidal. \text{Tenacity: } Brittle. \text{Hardness } = 7.5–8 \text{ D(meas.) } = 4.38–4.60 \text{ D(calc.) } = 4.607

Optical Properties: Translucent to nearly opaque. \text{Color: } Dark green, bluish green, blue to indigo, yellow to brown; in transmitted light, pale green; in reflected light, bluish green to green internal reflections. \text{Streak: } Gray. \text{Luster: } Vitreous. \text{Optical Class: } Isotropic. \text{n} = 1.79–1.80

Cell Data: \text{Space Group: } Fd\overline{3}m \text{(synthetic). } a = 8.0872(1) Z = 8

X-ray Powder Pattern: Synthetic. 2.438 (100), 2.861 (84), 1.429 (43), 1.556 (40), 1.650 (24), 0.8251 (13), 1.0525 (12)

Chemistry:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SiO(_2)</td>
<td>0.03</td>
<td>0.06</td>
<td></td>
<td>MnO</td>
<td>0.65</td>
<td>0.46</td>
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<tr>
<td>TiO(_2)</td>
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<td>0.00</td>
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<td>ZnO</td>
<td>34.06</td>
<td>19.88</td>
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<tr>
<td>Al(_2)O(_3)</td>
<td>57.71</td>
<td>60.80</td>
<td>55.61</td>
<td>MgO</td>
<td>0.61</td>
<td>7.33</td>
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<tr>
<td>FeO</td>
<td>7.85</td>
<td>12.09</td>
<td></td>
<td>Total</td>
<td>100.91</td>
<td>100.62</td>
</tr>
</tbody>
</table>

(1) Desolation Row pluton, Victoria Range, New Zealand; by electron microprobe, total Fe as FeO; corresponding to \((\text{Zn}_{0.75}\text{Fe}_{0.19}\text{Mg}_{0.03}\text{Mn}_{0.02})\Sigma=0.99(\text{Al}_{2.01}\text{Si}_{0.01})\Sigma=2.02\text{O}_4\). (2) Geco mine, Canada; by electron microprobe, average of six points, total Fe as FeO; corresponding to \((\text{Zn}_{0.41}\text{Mg}_{0.30}\text{Fe}_{0.28}\text{Mn}_{0.01})\Sigma=1.00\text{Al}_{1.99}\text{O}_4\). (3) \text{ZnAl}_2\text{O}_4.

Polymorphism & Series: Forms two series, with spinel, and with hercynite.

Mineral Group: Spinel group.

Occurrence: An accessory mineral in granites and granite pegmatites; in medium- to high-grade metamorphic rocks and metamorphosed base-metal sulfide deposits; in diaspores, formed by the low-grade metamorphism of bauxites; a detrital mineral in placers.

Association: Rhodonite, franklinite, calcite, andradite, willemite (Franklin, New Jersey, USA); corundum, pyrrhotite, högbomite, nigerite, phlogopite, staurolite, cordierite, pyrite, chalcopyrite (Geco mine, Canada).


Name: For the Swedish chemist and mineralogist, Johan Gottlieb Gahn (1745–1818), who discovered the mineral.


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