Griffith: Ca(Mn\(^{2+}\), Na, Li)\(_6\)Fe\(^{2+}\)Al\(_2\)(PO\(_4\))\(_6\)(F, OH)\(_2\)

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Crystal Data: Cubic; typically metamict in whole or part. Point Group: 2/m \(\overline{3}\). Massive, may be reniform, in nodules to 2 m.


Optical Properties: Transparent to translucent. Color: Very pale yellow, dark brown to brownish black when metamict; yellowish brown to brown in transmitted light. Luster: Resinous to vitreous.

Optical Class: Isotropic. \(n = 1.630–1.687\)

Cell Data: Space Group: \(Pa3\). \(a = 12.205(2)\) \(Z = 4\)


Chemistry:

<table>
<thead>
<tr>
<th>(P_2O_5)</th>
<th>(Al_2O_3)</th>
<th>(FeO)</th>
<th>(MnO)</th>
<th>(CaO)</th>
<th>(LiO)</th>
<th>(O = (F, Cl))</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>38.52</td>
<td>10.13</td>
<td>4.00</td>
<td>0.15</td>
<td>7.47</td>
<td>trace</td>
<td>[0.02]</td>
<td>[100.27]</td>
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<td>10.41</td>
<td>7.34</td>
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<td>5.86</td>
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<td>1.58</td>
<td>[98.68]</td>
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</tbody>
</table>

(1) Everly pegmatite, South Dakota, USA; average of two complete and three partial analyses; corresponds to \(Ca_{1.00}(Mn^{2+}_{0.38}Na_{0.17}Li_{0.31}K_{0.06}Mg_{0.04})\Sigma=0.61(Fe^{2+}_{0.50}Mn^{2+}_{0.25})\Sigma=0.75\) \((Al_{1.05}Fe_{0.65})\Sigma=2.00(PO_4^{2-}_{5.32}OH)\Sigma=6.00([OH]_{1.97}Cl_{0.03})\Sigma=2.00\). (2) Mas Claret, France; by AA, colorimetry, \(H_2O\) by the Penfield method; corresponds to \(Ca_{1.00}(Mn^{2+}_{0.56}Na_{1.05}Li_{0.52}Ca_{0.41}Fe^{2+}_{0.32}Fe^{3+}_{0.09}Mg_{0.06})\Sigma=5.99(Fe_{0.70}Mn^{2+}_{0.30})\Sigma=0.75Al_{2.00}(PO_4^{2-}_{5.81}OH)_{0.19}\Sigma=6.00\) \([F_{1.59}(OH)_{0.37}]\Sigma=1.96\). (3) Buranga pegmatite, Rwanda; by electron microprobe, total Fe as FeO; corresponds to \(Ca_{1.00}(Mn^{2+}_{0.25}Na_{1.11}Fe^{2+}_{1.06}Li_{0.72}Ca_{0.06})\Sigma=6.96Fe^{2+}_{0.75}Al^{3+}_{1.93}(PO_4^{2-}_{5.00})\Sigma=9.66\).

Occurrence: An accessory mineral in complex granite pegmatites.

Association: Crandallite, apatite, montebrasite, triplite, hausmannite, albite, mica, quartz.

Distribution: From the Riverton Lode [Everly mine], near Harney City, three km east of Keystone, and in the Sitting Bull mine, 1.5 km northwest of Keystone, Pennington Co., South Dakota, USA. At Mt. Ida, about 160 km northwest of Alice Springs, Northern Territory, Australia. In the Jaffit pegmatite, Katamivu, Zimbabwe. From the Buranga pegmatite, near Gatumba, Rwanda. In a pegmatite near Rehanna, Morocco. At Mas Claret, in the Albères massif, Pyrénées-Orientales, France. From an undefined locality near the Karachin River, Turkestan.

Name: From the Greek for "enigma," as the chemical composition was originally puzzling.


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