Galaxite \((\text{Mn}^{2+}, \text{Fe}^{2+}, \text{Mg})(\text{Al}, \text{Fe}^{3+})_2\text{O}_4\)

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Crystal Data:  Cubic.  \(^{\circ}\)  Point Group: \(4/m32/m\).  As octahedra and rounded grains, to 0.5 mm; as exsolution blebs.  Twinning:  On \{111\} as both twin and composition plane, the spinel law, probable.

Physical Properties:  \(^{\circ}\)  Fracture: Conchoidal.  Hardness = 7.5  \(D(\text{meas.}) = 4.234\)  \(D(\text{calc.}) = [4.22]\)

Optical Properties:  \(^{\circ}\)  Opaque; may be translucent in thin section.  \(^{\circ}\)  Color:  Black, red-brown, red to yellow; in transmitted light, golden yellow, brownish orange, mahogany-red, deep red to reddish black.  \(^{\circ}\)  Streak:  Red-brown.  \(^{\circ}\)  Luster:  Vitreous.

Optical Class:  Isotropic.  \(n = 1.923\)

Cell Data:  \(^{\circ}\)  Space Group: \(Fd\overline{3}m\).  \(a = 8.258\) \(Z = 8\)

X-ray Powder Pattern:  Synthetic MnAl\(_2\)O\(_4\).  \(2.492\ (100), 2.921\ (60), 1.4600\ (45), 1.5896\ (40), 0.8429\ (30), 2.065\ (25), 1.0749\ (25)\)

Chemistry:  \(\begin{array}{ccc} (1) & (2) & (3) \\ SiO\(_2\) & 0.96 & 0.30 \text{Mn} & 34.03 & 39.1 & 39.9 \\ TiO\(_2\) & \text{trace} & < 0.05 & \text{CoO} & 0.25 \\ Al\(_2\)O\(_3\) & 45.71 & 56.3 & 48.0 & \text{ZnO} & \text{trace} & 0.43 \\ Fe\(_2\)O\(_3\) & 4.6 & 8.9 & \text{MgO} & 1.50 & 0.83 & 1.79 \\ V\(_2\)O\(_3\) & 0.14 & \text{CaO} & \text{trace} \\ FeO & 16.36 & 0.0 & \end{array}\)  \(\begin{array}{rrr} \text{Total} & 98.56 & 101.7 & 99.0 \\ \end{array}\)

(1) Bald Knob, North Carolina, USA; total Fe as FeO.  (2) Do.; by electron microprobe, Fe\(^{2+}\):Fe\(^{3+}\) calculated from stoichiometry; corresponds to \((\text{Mn}\(_{0.95}\text{Mg}\(_{0.04}\text{Zn}\(_{0.01}\})\Sigma=1.00\) (Al\(_{1.90}\text{Fe}\(_{0.10}\)\Sigma=2.00)\text{O}_4\).  (3) Bonneval-sur-Arc, France; by electron microprobe, total Fe as Fe\(_2\)O\(_3\); corresponds to \((\text{Mn}\(_{0.92}\text{Mg}\(_{0.08}\})\Sigma=1.00(\text{Al}\(_{1.70}\text{Fe}\(_{0.20}\)\Sigma=2.00)\text{Si}\(_{0.09}\)\Sigma=2.00)\text{O}_4\).

Mineral Group:  Spinel group.

Occurrence:  In carbonate-rich, silica-undersaturated parts of metamorphosed manganese deposits.

Association:  Alleghanyite, rhodonite, sonolite, spessartine, tephroite, kutnohorite, manganhumite, jacobsite, kellyite, alabandite (Bald Knob, North Carolina, USA); katoptrite, magnetite, manganostibite, manganosite, tephroite, manganhumite, manganosite (Brattfors mine, Sweden).

Distribution:  Occurs near Bald Knob, Alleghany Co., North Carolina, USA. In the Brattfors and Jakobsberg mines, Värmland, Sweden. In France, found near Bonneval-sur-Arc, Haute-Savoie. In Japan, found at the Noda-Tamagawa mine and Hijikuzu, Iwate Prefecture; the Oshli mine, Tochigi Prefecture; the Taguchi mine, Aichi Prefecture; the Ioi mine, Shiga Prefecture; and the Fukumaki mine, Yamaguchi Prefecture.

Name:  For Galax, Virginia, USA, close to Bald Knob, North Carolina, and for the plant, \textit{galax}, after which the town is named.

Type Material:  n.d.


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