Johnsomervilleite $\mathbf{Na_2Ca(Fe^{2+},Mg,Mn^{2+})_7(PO_4)_6}$

Crystal Data: Hexagonal; may be metamict. *Point Group:* $\overline{3}$ (probable). As grains or blebs, to 2 cm; in dendritic or coralloidal groups.

Physical Properties: *Cleavage:* Perfect, on {0001}, probable. *Fracture:* Subconchoidal to splintery. *Tenacity:* Brittle. Hardness = 4.5 D(meas.) = 3.35 D(calc.) = 3.41

Optical Properties: Translucent. *Color:* Very dark brown to blackish gray, pitch-black; brown in transmitted light. *Streak:* Pale brown; gray-brown with an olive tint. *Luster:* Vitreous. *Optical Class:* Biaxial (+), anomalous; isotropic if metamict. $n = 1.646(1)$ (metamict). $\alpha = 1.655$ $\beta = \sim 1.655$ $\gamma =$ n.d. 2V(meas.) = 10°

Cell Data: *Space Group:* $[R\overline{3}]$ (by analogy to fillowite). $a = 15.00$ $c = 42.75$ Z = 18

X-ray Powder Pattern: Loch Quoich, Scotland.
2.764 (100), 3.70 (70), 3.55 (70), 2.965 (70), 11.20 (50), 2.501 (40), 1.852 (20)

Chemistry:

	(1)
P_2O_5	44.7
FeO	26.2
MnO	5.2
MgO	12.9
CaO	6.2
Na_2O	4.7
Total	99.9

(1) Loch Quoich, Scotland; by electron microprobe, average of eight analyses, total Fe as FeO, total Mn as MnO; corresponding to $Na_{1.43}Ca_{1.05}(Fe_{3.47}Mg_{3.05}Mn_{0.70})_{\Sigma=7.22}(PO_4)_6$.

Occurrence: As one of several primary accessory minerals forming clusters in podiform metamorphic segregations in kyanite-sillimanite-grade gneiss (Loch Quoich, Scotland); a primary mineral in a complex granite pegmatite in staurolite-grade mica schist (Sapucaia mine, Brazil); in type IIIAB iron meteorites.

Association: Graftonite, apatite, jahnsite, phosphosiderite, vivianite, rockbridgeite, mitridatite, almandine-spessartine, muscovite, plagioclase, quartz (Loch Quoich, Scotland); triphylite, frondelite, huréaulite, bermanite, jahnsite, rockbridgeite, phosphosiderite, vivianite, autunite, zircon, tourmaline, microcline, albite, quartz (Sapucaia mine, Brazil).

Distribution: From near the entrance to Glen Cosaidh, Loch Quoich, Inverness-shire, Scotland. In the Sapucaia pegmatite mine, about 50 km east-southeast of Governador Valadares, Minas Gerais, Brazil. At the Kiluli pegmatite, Rwanda.

Name: Honors John M. Somerville (1908–1978), who collected the first specimens.

Type Material: Royal Scottish Museum, Edinburgh, Scotland; The Natural History Museum, London, England, 1981,70.

References: (1) Livingstone, A. (1980) Johnsomervilleite, a new transition-metal phosphate mineral from the Loch Quoich area, Scotland. Mineral. Mag., 43, 833–836. (2) (1981) Amer. Mineral., 66, 437 (abs. ref. 1). (3) Cassedanne, J.P. and J.O. Cassedanne (1985) Découverte d'un phosphate métamicte dans la pegmatite du Sapucaia (Minas Gerais). Anais da Academia brasileira de Ciências, 57(3), 325–337 (in French with English abs.).