

Crystal Data: Monoclinic. *Point Group:* 2/m. As foliated aggregates ~3 cm across of parallel tablets, to 7 mm, flattened parallel to {010}.

Physical Properties: *Cleavage:* None. *Fracture:* Uneven. *Tenacity:* Brittle. *Hardness* = ~7
D(meas.) = n.d. D(calc.) = 3.61

Optical Properties: Transparent. *Color:* Very dark green. *Streak:* Green-gray. *Luster:* Vitreous.
Optical Class: Biaxial (-). $\alpha = 1.725(2)$ $\beta = 1.740(2)$ $\gamma = 1.741(2)$ $2V(\text{meas.}) = 34.4(1.8)^\circ$
 $2V(\text{calc.}) = 29^\circ$ *Pleochroism:* X = colorless or very light tan, Y = blue-green, Z = deep blue-green.
Dispersion: $v > r$, strong. *Orientation:* Y || b.

Cell Data: *Space Group:* P2₁/c. $a = 19.800(1)$ $b = 14.371(1)$ $c = 11.254(1)$ $\beta = 125.53(1)^\circ$ Z = 4

X-ray Powder Pattern: Khmara Bay, Enderby Land, Antarctica.
2.446 (100), 2.0106 (85), 2.0140 (61), 2.826 (45), 2.4387 (44), 2.3405 (43), 2.9852 (38)

Chemistry:	(1)
SiO ₂	20.27
Al ₂ O ₃	51.15
Fe ₂ O ₃	[0.70]
FeO	[9.43]
MgO	15.49
CaO	0.16
BeO	2.51
B ₂ O ₃	0.05
Total	99.76

(1) Khmara Bay, Enderby Land, Antarctica ; average electron microprobe, FeO and Fe₂O₃ calculated from FeO = 10.06; corresponds to Ca_{0.04}Mg_{5.46}Fe³⁺_{0.12}Fe²⁺_{1.87}Al_{14.26}Be_{1.43}B_{0.02}Si_{4.80}O₄₀.

Polymorphism & Series: Likely continuous solid solution between Be-free sapphirine of composition (Mg,Fe)_{7.5}(Al,Fe)₁₇Si_{3.5}O₄₀ and khmaralite. Distinguishing the two minerals using microprobe analyses, powder X-ray patterns, and optical properties would be equivocal.

Occurrence: In a pegmatite metamorphosed at granulite-facies likely from pre-existing pegmatitic Be phases such as beryllian cordierite.

Association: Surinamite, musgravite, sillimanite, garnet, biotite, apatite, rutile, dumortierite, quartz, microcline.

Distribution: From "Zircon Point", Khmara Bay, Enderby Land, Antarctica [TL].

Name: For the locality, from which the first samples were collected, named for Ivan Fedorovich *Khmara* (1936-1956), a tractor driver on the Soviet Antarctic Expedition who perished in Antarctica.

Type Material: National Museum of Natural History, Washington, D.C., USA (NMNH 171532).

References: (1) Barbier, J., E.S. Grew, P.B. Moore, and S.-C. Su (1999) Khmaralite, a new beryllium-bearing mineral related to sapphirine: A superstructure resulting from partial ordering of Be, Al, and Si on tetrahedral sites. *Amer. Mineral.*, 84, 1650-1660. (2) Christy, A.G. and E.S. Grew (2004) Synthesis of beryllian sapphirine in the system MgO-BeO-Al₂O₃-SiO₂-H₂O and comparison with naturally occurring beryllian sapphirine and khmaralite, Part 2: A chemographic study of Be content as a function of P, T, assemblage and FeMg₁ exchange. *Amer. Mineral.*, 89, 327-338.