

Chevkinite-(Ce)**(Ce, La, Ca)₄(Fe²⁺, Mg)₂(Ti, Fe³⁺)₃Si₄O₂₂**

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Crystal Data: Monoclinic. *Point Group:* 2/m. Small lamellar, lenticular, and prismatic crystals; massive, in lumps to 10 cm. *Twinning:* Twin plane {001}.

Physical Properties: *Fracture:* Irregular to conchoidal. *Tenacity:* Brittle. Hardness = 5.5–6 D(meas.) = 4.53–4.67 D(calc.) = [4.99]

Optical Properties: Opaque except on thin edges. *Color:* Dark reddish brown to black. *Luster:* Resinous to dull.

Optical Class: Biaxial (-). *Pleochroism:* X = almost colorless; Y = reddish brown; Z = dark brown. *Orientation:* Z ∧ c = 11°–26°. *Dispersion:* r < v, distinct to strong. *Absorption:* Z > Y > X. α = n.d. β = 1.88–2.02 γ = n.d. 2V(meas.) = Medium.

Cell Data: *Space Group:* P2₁/a. a = 13.370(3) b = 5.660(2) c = 11.280(3) β = 100°52(2)' Z = [2]

X-ray Powder Pattern: Meade Co., Kansas, USA; some materials are metamict. 3.17 (100), 3.14 (100), 2.71 (100), 2.16 (50), 1.961 (50), 4.58 (40), 3.46 (40)

Chemistry:	(1)	(2)		(1)	(2)
SiO ₂	19.23	12.04	Nb ₂ O ₅	0.01	
TiO ₂	19.61	17.08	FeO	8.85	7.76
ThO ₂	0.73	0.82	MnO	1.11	0.50
Al ₂ O ₃	2.17	0.93	MgO	0.05	0.74
Y ₂ O ₃	0.93	1.50	CaO	2.49	3.35
(La, Dy) ₂ O ₃	18.77	18.35	(Na, K) ₂ O	0.10	
Ce ₂ O ₃	20.52	25.29	H ₂ O	0.81	1.50
Fe ₂ O ₃	2.60	9.56	P ₂ O ₅		0.38
Cr ₂ O ₃	0.07		SO ₃	0.15	
			Total	98.10	99.80

(1) Ural Mountains, Russia. (2) Mohave Co., Arizona, USA.

Polymorphism & Series: Dimorphous with perrierite.

Occurrence: As an accessory mineral in some granites, and in pegmatites associated with alkalic granite and syenites; in air-fall ash deposits.

Association: Titanite, monazite, apatite, cronstedtite, quartz (Aquarius Mountains, Arizona, USA).

Distribution: From the Ilmen Mountains, Southern Ural Mountains; the Keivy massif, Kola Peninsula; and elsewhere in Russia. At Buer, Björkedalen, Norway. From Glen Bay, Na h-Eagan, and Conachair, in the Isles of St. Kilda, Outer Hebrides, Scotland. In Madagascar, from the Tordendrika-Ifasina region, Androngovato, and Ifasina, Ambatofinandrahana. In the USA, in the Aquarius Mountains, Mohave Co., Arizona; the Jemez Mountains and Pueblo Mesa, Rio Arriba Co., New Mexico; at Onion Creek, Grand Co., Utah; in Yellowstone National Park, Wyoming; from Irish Flats, Meade Co., Kansas. Also in the Spruce Pine district, Mitchell Co., North Carolina; near Martin's Store, Nelson Co., Virginia; and in New Hampshire, from near Stark, Coos Co. A few other localities have been verified.

Name: In honor of General-Major Konstantin Vladimirovich Tschevkin [Chevkin] (1802–1875), Chief of Staff of the Russian Mining Engineers Corps.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 718. (2) Vlasov, K.A., Ed. (1966) Mineralogy of rare elements, v. II, 309–312. (3) Kauffman, A.J., Jr. and H.W. Jaffe (1946) Chevkinite (tscheffkinite) from Arizona. Amer. Mineral., 31, 582–588. (4) Mitchell, R.S. (1966) Virginia metamict minerals: perrierite and chevkinite. Amer. Mineral., 51, 1394–1405. (5) Izett, G.A. and R.E. Wilcox (1968) Perrierite, chevkinite, and allanite in upper Cenozoic ash beds in the western United States. Amer. Mineral., 53, 1558–1567.

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