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Crystal Data: Monoclinic; hexagonal; orthorhombic; commonly metamict. Point Group: 2/m; 32; 2/m 2/m. Crystals, typically prismatic, elongated along [001], to 5 cm; polytypes are commonly intergrown. Twinning: Polysynthetic.

Physical Properties: Cleavage: $\{100\}$, $\{010\}$ in traces. Fracture: Irregular to conchoidal. Tenacity: Brittle. Hardness = 6.5 D(meas.) = 4.017-4.237; 4.77-4.85 D(calc.) = [4.38] Radioactive.

Optical Properties: Opaque, transparent in thin fragments. *Color:* Brown to black; yellowish or brownish in thin section. *Streak:* Brownish yellow to dark brown. *Luster:* Submetallic; adamantine to greasy.

Optical Class: Isotropic. n = 2.06-2.17; 2.215 ("polymignyte").

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Cell Data: Space Group: C2/c or Cc (2M), with a = 12.431(1) b = 7.224(1) c = 11.483(3) \beta = 100.33(1)^{\circ} Z = 8, or Space Group: P3_121 (3T), with a = 7.287(2) c = 16.886(9) Z = 3, or Space Group: Acam (3O), with a = 10.148(4) b = 14.147(5) c = 7.278(3) Z = [8]
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X-ray Powder Pattern: Afrikanda massif, Russia; after heating at 1000 °C for two hours; polytypes cannot be distinguished by powder X-ray methods. 2.914 (10), 1.980 (9), 1.792 (9), 2.506 (4), 3.176 (3), 1.517 (1), 1.156 (1)

Chemistry:	(1)	(2)		(1)	(2)		(1)	(2)
U_3O_8	1.53		UO_2		1.4	MgO	0.45	
Nb_2O_5	3.26	15.7	$\mathrm{Al_2O_3}$	1.03		CaO	11.05	12.5
SiO_2	2.05		RE_2O_3	6.22	0.9	Na_2O	0.37	
TiO_2	31.69	22.7	Fe_2O_3	5.49	5.32	$\mathrm{H_2O}$	3.35	
${\rm ZrO}_2$	32.84	34.8	FeO		2.28	Total	99.97	99.9
$\overline{\text{ThO}_{2}}$	0.58	4.1	MnO	0.06	0.2	10001	00.01	00.0

(1) Afrikanda massif, Russia; LOI taken as H_2O , corresponds to $(Ca_{0.76}Ce_{0.15}Na_{0.04}U_{0.02}Th_{0.01})_{\Sigma=0.98}Zr_{1.03}(Ti_{1.53}Fe_{0.27}Nb_{0.09}Al_{0.08}Mg_{0.04})_{\Sigma=2.01}O_7$. (2) Kaiserstuhl, Germany; by electron microprobe, corresponding to $(Ca_{0.85}Th_{0.06}U_{0.02}RE_{0.02})_{\Sigma=0.95}Zr_{1.08}(Ti_{1.08}Nb_{0.45}Fe_{0.25}^{3+}Fe_{0.12}^{2+}Mn_{0.01})_{\Sigma=1.91}O_7$.

Polymorphism & Series: Polytypoids 2M, 3T, 3O are known.

Occurrence: In alkaline rocks, as carbonatites, kimberlites, syenites, sanidinites; more rarely in ultramafic rocks; in felsic pegmatite in gabbro; a detrital mineral.

Association: Apatite, clinohumite, phlogopite, richterite, pyrochlore, baddeleyite, perovskite, titanite, pyrrhotite, calcite.

Distribution: In the Afrikanda pyroxenite massif, Kola Peninsula, Russia. At Fredriksvärn, and Agnes Sandefjord, Vestfold, Norway. In the Kaiserstuhl carbonatite, Baden-Württemberg, Germany. From Monte di Procida, Campi Flegrei, Campania, Italy. In the Laouni intrusive, 250 km south of Tamanrasset, Algeria. In Sri Lanka, from Walaweduwa; in the Alupola stream, Bambarabotuwa district; and elsewhere in Sabaragamuwa Province. In some basalt samples from the Moon.

Name: As a ZIRCONium-bearing mineral.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 59249–59251, vis6008, vis6012, vis6018.

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