

Thorbastnäsite**Th(Ca, Ce)(CO₃)₂F₂•3H₂O**

©2001-2005 Mineral Data Publishing, version 1

Crystal Data: Hexagonal. *Point Group:* $\bar{6}m2$. As cryptocrystalline masses.**Physical Properties:** Hardness = n.d. D(meas.) = 4.04, thought low due to excess H₂O. D(calc.) = 5.70 Radioactive.**Optical Properties:** Semitransparent. *Color:* Brown.
Optical Class: Uniaxial. $n = 1.670$ – 1.678 $\omega =$ n.d. $\epsilon =$ n.d.**Cell Data:** *Space Group:* $P\bar{6}2c$. $a = 6.99(2)$ $c = 9.71(2)$ $Z = 3$ **X-ray Powder Pattern:** Pichikhol massif, Russia.
2.85 (10), 2.03 (10b), 3.54 (8), 1.870 (7), 1.279 (6), 1.656 (5), 1.165 (5)

Chemistry:	(1)		(1)
	CO ₂	14.78	Dy ₂ O ₃
	SiO ₂	2.01	Ho ₂ O ₃
	ThO ₂	46.79	Er ₂ O ₃
	TiO ₂	0.05	Yb ₂ O ₃
	U ₃ O ₈	0.11	Fe ₂ O ₃
	Al ₂ O ₃	1.76	PbO
	Y ₂ O ₃	1.73	CaO
	La ₂ O ₃	1.59	F
	Ce ₂ O ₃	1.28	H ₂ O ⁺
	Pr ₂ O ₃	0.34	H ₂ O ⁻
	Nd ₂ O ₃	1.22	–O = F ₂
	Sm ₂ O ₃	0.25	<hr/>
	Gd ₂ O ₃	0.25	Total
			100.04

(1) Pichikhol massif, Russia; RE by spectroscopic analysis, IR confirms H₂O; corresponds to Th_{1.05}(Ca_{0.85}Y_{0.09}La_{0.06}Ce_{0.04}Nd_{0.04}Pr_{0.01}Sm_{0.01}Gd_{0.01}Dy_{0.01}Er_{0.01}Yb_{0.01})_{Σ=1.14}(CO₃)_{2.00}F_{2.15}•3.70H₂O.**Occurrence:** In metasomatic albitite and quartz–muscovite veinlets in an alkaline exocontact surrounding a syenite intrusive.**Association:** Rinkite, zircon, pyrochlore, euxenite-(Y), thorite.**Distribution:** From the Pichikhol alkaline massif, Balygtyg-Khem River, Sangilen Upland, Tuva, Siberia, Russia.**Name:** For a *thorium*-bearing mineral chemically similar to *bastnäsite*.**Type Material:** A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 72030.**References:** (1) Pavlenko, A.S., L.P. Orlova, M.V. Akhmanova, and K.I. Tobelko (1965) A thorium fluorocarbonate – thorbastnäsite. Zap. Vses. Mineral. Obshch., 94, 105–113 (in Russian). (2) (1965) Amer. Mineral., 50, 1505 (abs. ref. 1). (3) Pekov, I.V. (1998) Minerals first discovered on the territory of the former Soviet Union. Ocean Pictures, Moscow, 208.