

Khanneshite**(Na, Ca)₃(Ba, Sr, Ce, Ca)₃(CO₃)₅**

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Crystal Data: Hexagonal. *Point Group:* 6mm. As elongated hexagonal crystals, to 1 cm, in radially fibrous or fine-grained aggregates.**Physical Properties:** *Cleavage:* One, parallel elongation, indistinct; and a transverse parting. *Tenacity:* Brittle. *Hardness =* “Soft”. *D(meas.) =* 3.8–3.9 *D(calc.) =* 3.94**Optical Properties:** Semitransparent. *Color:* Pale yellow to nearly colorless. *Optical Class:* Uniaxial (-). $\omega = 1.620\text{--}1.623$ $\epsilon = 1.608\text{--}1.610$ **Cell Data:** *Space Group:* *P*6₃*mc.* *a* = 10.65(1) *c* = 6.58(1) *Z* = 2**X-ray Powder Pattern:** Khanneshin complex, Afghanistan. 2.66 (100), 3.08 (62), 2.19 (55), 3.78 (50), 2.09 (42), 1.691 (40), 5.34 (30)

Chemistry:	(1)	(2)	(3)
CO ₂	28.48	28.85	[30.59]
RE ₂ O ₃	10.41	11.18	
La ₂ O ₃			4.07
Ce ₂ O ₃			10.46
Pr ₂ O ₃			1.01
Nd ₂ O ₃			3.60
CaO	6.40	9.25	5.37
SrO	7.16	8.32	9.04
BaO	36.38	31.92	22.99
Na ₂ O	8.63	8.39	11.86
K ₂ O	0.95	0.77	0.00
H ₂ O	1.59	1.32	
Total	[100.00]	[100.00]	98.99

(1) Khanneshin complex, Afghanistan; recalculated to 100% from an original total of 99.98% after deduction of admixed barite, dolomite, and “chlorite” 1.98%; RE = Y 7.5%, La 20.3%, Ce 44.0%, Pr 6.0%, Nd 9.5%, Sm 6.0%, Eu 0.1%, Gd 4.8%, Tb 0.5%, Dy 0.3%, Ho 0.2%, Er 0.8%, Yb 0.5%; corresponds to (Na_{2.13}Ca_{0.87}) $\Sigma=3.00$ (Ba_{1.82}Sr_{0.53}RE_{0.49}K_{0.15}) $\Sigma=2.99$ (CO₃)_{4.96}•0.67H₂O.

(2) Do.; recalculated to 100% from an original total of 100.87% after deduction of admixed barite, dolomite, and “chlorite” 2.55%; RE= Y 5.8%, La 20.9%, Ce 51.2%, Pr 4.7%, Nd 7.3%, Sm 4.7%, Eu 0.1%, Gd 3.7%, Dy 0.4%, Ho 0.1%, Er 0.9%, Yb 0.2%; corresponds to (Na_{2.02}Ca_{0.98}) $\Sigma=3.00$ (Ba_{1.55}Sr_{0.60}RE_{0.51}Ca_{0.25}K_{0.12}) $\Sigma=3.03$ (CO₃)_{4.89}•0.55H₂O. (3) Khibiny massif, Kola Peninsula, Russia; corresponds to (Na_{2.75}Ca_{0.23}) $\Sigma=2.98$ (Ba_{1.08}Sr_{0.63}Ca_{0.46}Ce_{0.46}La_{0.18}Nd_{0.15}Pr_{0.04}) $\Sigma=3.00$ (CO₃)_{5.00}.

Occurrence: Disseminated in hydrothermally-altered fine-grained carbonatite (Khanneshin complex, Afghanistan); in a drillcore in a carbonatite veinlet from a differentiated alkalic massif (Khibiny massif, Kola Peninsula, Russia).**Association:** Dolomite, calkingsite-(Ce), carbocernaite, mckelveyite, barite, “chlorite” (Khanneshin complex, Afghanistan); calcite, dawsonite, magnetite (Khibiny massif, Kola Peninsula, Russia).**Distribution:** From the Khanneshin carbonatite complex, Afghanistan. At Tuliylukht Bay, Khibiny massif, Kola Peninsula, Russia.**Name:** For the Khanneshin complex, Afghanistan, its first-noted occurrence.**Type Material:** Mining Institute, St. Petersburg; A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia.**References:** (1) Yeremenko, G.K. and V.A. Bel’ko (1982) Khanneshite, (Na, Ca)₃(Ba, Sr, RE, Ca)₃(CO₃)₅ – a new mineral of the burbankite group. *Zap. Vses. Mineral. Obshch.*, 111, 321–324 (in Russian). (2) (1983) *Amer. Mineral.*, 68, 1249 (abs. ref. 1). (3) Pekov, I.V., N.V. Chukanov, and Y.V. Belovitskaya (1998) Khanneshite and petersenite-(Nd) from Khibiny massif. *Zap. Vses. Mineral. Obshch.*, 127(2), 92–100 (in Russian with English abs.).

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