Alexkuznetsovite-(Ce) $Ce_2Mn(CO_3)(Si_2O_7)$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As isolated anhedral grains to 0.9 mm in nodules.

Physical Properties: Cleavage: None. *Tenacity*: Brittle. *Fracture*: Uneven. Hardness = ~5 VHN = 690-800, 745 average (150 g load). D(meas.) = n.d. D(calc.) = 4.687 Nonfluorescent.

Optical Properties: Translucent. *Color*: Brown to dark brown. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Biaxial (-). α = 1.790(6) β = 1.812(6) γ = 1.824(8) 2V(meas.) = 70 (10)° 2V(calc.) = 72° Non-pleochroic. *Dispersion*: Weak, $r > v$.

Cell Data: *Space Group*: $P2_1/c$. a = 6.5764(4) b = 6.7685(4) c = 18.749(1) β = 108.672(8)° Z = 4

X-ray Powder Pattern: Mochalin Log *REE* deposit, Chelyabinsk Oblast', Southern Urals, Russia. 2.893 (100), 2.797 (36), 4.145 (35), 3.177 (26), 1.833 (26), 1.808 (25), 2.027 (24)

Chemistry:

	(1)	(2)
CaO	1.42	
La_2O_3	22.59	
Ce_2O_3	28.18	58.26
Pr_2O_3	2.17	
Nd_2O_3	4.91	
ThO_2	0.28	
MgO	0.17	
MnO	6.35	12.60
FeO	4.22	
SiO_2	21.45	21.33
CO_2	[7.88]	7.81
H_2O	[0.11]	.
Total	99.73	100.00

(1) Mochalin Log *REE* deposit, Chelyabinsk Oblast', Southern Urals, Russia; average electron microprobe and Raman spectroscopic analyses, CO_2 and H_2O calculated from stoichiometry, CO_3:HCO_3 calculated for charge-balance; corresponds to $(Ce_{0.96}La_{0.78}Nd_{0.16}Pr_{0.07}Th_{0.01})_{\Sigma=1.97}(Mn^{2+}_{0.50}Fe^{2+}_{0.33}Ca_{0.14}Mg_{0.02})_{\Sigma=0.99}(CO_3)_{0.93}(HCO_3)_{0.07}(Si_2O_7)$. (2) $Ce_2Mn(CO_3)(Si_2O_7)$.

Mineral Group: Biraite group.

Occurrence: As part of rich *REE* mineralization in polymineralic nodules of the Mochalin Log placer deposit, probably formed during fenitization of granitic pegmatites within granite-gneisses in the exocontact zone of an alkaline intrusion.

Association: Allanite-(Ce)/-(La), bastnäsite-(Ce)/-(La), fluorbritholite-(Ce), perbøeite-(Ce)/-(La), percleveite-(Ce)/-(La), törnebohmite-(Ce)/-(La), biraite-(Ce), ferriallanite-(Ce)/-(La), ferriperbøeite-(Ce)/-(La), perrierite-(Ce)/-(La),monazite-(Ce)/-(La).

Distribution: From the Mochalin Log *REE* deposit, 14 km north of Kyshtym, Chelyabinsk Oblast', Southern Urals, Russia.

Name: Honors Russian mineral collector Alexey M. *Kuznetsov* (b. 1962) who provided samples of the studied material. The suffix is the dominant *REE*. The Ce-analogue of *alexkuznetsovite*-(La).

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (5416/3; 97008 holotype and 97026 cotype).

References: (1) Kasatkin, A.V., N.V. Zubkova, I.V. Pekov, N.V. Chukanov, R. Škoda, A.A. Agakhanov, D.I. Belakovskiy, S.N. Britvin, and D.Y. Pushcharovsky (2021) The mineralogy of the historical Mochalin Log REE deposit, South Urals, Russia. Part IV. Alexkuznetsovite-(La), $La_2Mn(CO_3)(Si_2O_7)$, alexkuznetsovite-(Ce), $Ce_2Mn(CO_3)(Si_2O_7)$ and biraite-(La), $La_2Fe^{2+}(CO_3)(Si_2O_7)$, three new isostructural minerals and a definition of the biraite group. Mineral. Mag., 85, 772-783.