Mckelveyite-(Y)  

Na(Ca, U)Ba_3Y(CO_3)_6·3H_2O

Crystal Data: Triclinic, pseudorhombohedral. Point Group: 1. Crystals are tabular to pyramidal, with pseudorhombohedral \{10\overline{2}\}, \{10\overline{1}\}, \{00\overline{1}\}, small \{001\}, may be rough, to 5 cm. Twinning: By three-fold rotation about pseudorhombohedral [001] in 120° increments.


Cell Data: Space Group: P1. \(a = 9.170(3)\) \(b = 9.169(3)\) \(c = 7.075(2)\) \(α = 102.50(3)°\) \(β = 115.63(3)°\) \(γ = 59.99(3)°\) \(Z = 1\)

X-ray Powder Pattern: Sweetwater Co., Wyoming, USA.

2.942 (100), 4.47 (85), 2.648 (40), 6.40 (35), 3.32 (30), 2.040 (30), 4.15 (20)

Chemistry:

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\begin{align*}
\text{CO}_2 & \quad 25.7 & \text{RE}_2\text{O}_3 & \quad 5.7 & \text{Na}_2\text{O} & \quad 3.9 \\
\text{UO}_2 & \quad 4.6 & \text{CaO} & \quad 4.0 & \text{K}_2\text{O} & \quad 0.1 \\
\text{Th}_2\text{O}_5 & \quad 0.1 & \text{SrO} & \quad 1.7 & \text{H}_2\text{O} & \quad 6.1 \\
\text{Y}_2\text{O}_3 & \quad 7.7 & \text{BaO} & \quad 40.6 & \text{Total} & [100.2]
\end{align*}
\]

(1) Diamond Alkali No. 3 drillhole, Wyoming, USA; by a combination of gravimetric and spectrophotometric analyses, \(\text{RE}_2\text{O}_3 = \text{La}_2\text{O}_3 0.09\text{%, Ce}_2\text{O}_3 0.16\text{%, Pr}_2\text{O}_3 0.05\text{%, Nd}_2\text{O}_3 0.26\text{%, Sm}_2\text{O}_3 0.34\text{%, Eu}_2\text{O}_3 0.19\text{%, Gd}_2\text{O}_3 1.18\text{%, Tb}_2\text{O}_3 0.38\text{%, Dy}_2\text{O}_3 1.00\text{%, Ho}_2\text{O}_3 0.28\text{%, Er}_2\text{O}_3 0.95\text{%, Tm}_2\text{O}_3 0.12\text{%, Yb}_2\text{O}_3 0.61\text{%, Lu}_2\text{O}_3 0.08\%\); recalculated to 100% mckelveyite after deduction of organic 3%, acmite 2.45%, \(\text{biotite}^{2}\) 9.40%, quartz 3.02%; then corresponds to \(\text{(Na}_{1.26}\text{K}_{0.02})\Sigma=1.28\text{Ca}_{0.71}\text{U}_{0.17}\Sigma=0.88\text{(Ba}_{2.64}\text{Sr}_{0.16})\Sigma=2.80\text{(Y}_{1.66}\text{RE}_{0.31})\Sigma=0.99\text{(CO}_3)_{5.98}·3\text{H}_2\text{O}\).

Occurrence: A rare mineral formed near trona beds in the Green River Formation (Wyoming, USA); in a differentiated alkalic massif (Khöbün massif, Kola Peninsula, Russia).

Association: Ewaldite, acmite, “biotite”, quartz, labuntsovite, sarlesite, leucosphenite (Wyoming, USA); ewaldite, belovite-(Ce), fluorite, nenadkevichite, ancylite-(Ce), synchysite-(Ce), kukharenkoite-(Y), burbankite, calcite, barite, orthoclase (Khöbün massif, Russia); dolomite, calkinsite-(Ce), carbocernaite, khanneshite, barite (Khänneshín complex, Afghanistan).

Distribution: In the USA, in the Westvaco trona mine, the John Hay, Jr. Well No. 1, the Diamond Alkali Daco No. 3 and Reid No. 2 drillholes, the Perkins Green River No. 3 drillhole, and the Texas Gulf Sulfur mine, all near Green River, Sweetwater Co., Wyoming. At Mont Saint-Hilaire, Quebec, Canada. In Russia, large crystals in the Khöbün and Sallanlatvi massifs, and the Vuoriyarvi carbonatite complex, Kola Peninsula. From the Khänneshín carbonatite complex, Afghanistan.

Name: To honor Vincent Ellis McKelvey (1916–1985), Director of the U.S. Geological Survey, Washington, D.C., USA, for his studies of the Phosphoria Formation of Wyoming and Idaho, USA.
