Mckelveyite-(Y)  
Na(Ca, U)Ba₃Y(CO₃)₆·3H₂O

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Crystal Data: Triclinic, pseudorhombohedral.  
Point Group: 1.  Crystals are tabular to pyramidal, with pseudorhombohedral {1012}, {101}, {0001}, small {0001}, may be rough, to 5 cm.  
Twinning: By three-fold rotation about pseudorhombohedral {0001} in 120° increments.

Physical Properties:  
Hardness = 3.5–4.  
D(meas.) = 3.25(5)  
D(calc.) = 3.37  
Radioactive.

Optical Properties:  
Transparent to opaque.  
Color: Lime-yellow, greenish gray, reddish brown, black from contained organic material; transparent in thin section.  
Luster: Vitreous to dull.  
Optical Class: Uniaxial (-).  
Pleochroism: In greens.  
Absorption: O > E.  
ω = 1.644–1.66  
ε = 1.550–1.57

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:  
(1) Diamond Alkali No. 3 drillhole, Wyoming, USA; by a combination of gravimetric and spectrophotometric analyses, RE₂O₃ = La₂O₃ 0.09%, Ce₂O₃ 0.16%, Pr₂O₃ 0.05%, Nd₂O₃ 0.26%, Sm₂O₃ 0.34%, Eu₂O₃ 0.19%, Gd₂O₃ 1.18%, Tb₂O₃ 0.38%, Dy₂O₃ 1.00%, Ho₂O₃ 0.28%, Er₂O₃ 0.95%, Tm₂O₃ 0.12%, Yb₂O₃ 0.61%, Lu₂O₃ 0.08%; recalculated to 100% mckelveyite after deduction of organic 3%, acmite 2.45%, ²biotite 9.40%, quartz 3.02%; then corresponds to (Na₂.90₂Ca₀.10₂Sr₀.10₂K₀.50₂Ba₀.19₂U₀.03₂Na₀.38₂Ca₀.61₂Sr₀.08₂K₀.38₂Ba₀.10₂U₀.02₂Na₀.30₂Ca₀.69₂Sr₀.02₂K₀.31₂Ba₀.02₂U₀.01₂Na₀.26₂Ca₀.71₂U₀.17₂Na₀.88₂Ba₀.64₂Sr₀.16₂Y₀.88₂Ba₀.64₂Sr₀.31₂Na₀.99₂(CO₃)₅.98₂.H₂O.

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

Association: Ewaldite, acmite, “biotite”, quartz, labunsoyite, searlesite, leucosphenite (Wyoming, USA); ewaldite, belovite-(Ce), fluorite, nenadkevichite, ancylite-(Ce), synchysite-(Ce), kukharenkoite-(Y), burbankite, calcite, barite, orthoclase (Khibiny massif, Russia); dolomite, calciospar, khanneshite, barite (Khannesin 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 Khibiny and Sallalatvi massifs, and the Vuoriyarvi carbonatite complex, Kola Peninsula. From the Khannesin 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.


References:  