

McKelveyite-(Y)**Na(Ca, U)Ba₃Y(CO₃)₆•3H₂O**

(c)2001-2005 Mineral Data Publishing, version 1

Crystal Data: Triclinic, pseudorhombohedral. *Point Group:* 1. Crystals are tabular to pyramidal, with pseudorhombohedral {10 $\bar{1}$ 2}, {10 $\bar{1}$ 1}, {000 $\bar{1}$ }, 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:* $O > E$. $\omega = 1.644$ – 1.66 $\epsilon = 1.550$ – 1.57

Cell Data: *Space Group:* $P1$. $a = 9.170(3)$ $b = 9.169(3)$ $c = 7.075(2)$ $\alpha = 102.50(3)^\circ$ $\beta = 115.63(3)^\circ$ $\gamma = 59.99(3)^\circ$ $Z = 1$

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)	(1)	(1)
CO ₂	25.7	RE ₂ O ₃	5.7
UO ₂	4.6	CaO	4.0
ThO ₂	0.1	SrO	1.7
Y ₂ O ₃	7.7	BaO	40.6
		Total	[100.2]

(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%, “biotite” 9.40%, quartz 3.02%; then corresponds to (Na_{1.26}K_{0.02}) $\Sigma=1.28$ (Ca_{0.71}U_{0.17}) $\Sigma=0.88$ (Ba_{2.64}Sr_{0.16}) $\Sigma=2.80$ (Y_{0.68}RE_{0.31}) $\Sigma=0.99$ (CO₃)_{5.98}•3.22H₂O.

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, labuntsovite, searlesite, leucosphenite (Wyoming, USA); ewaldite, belovite-(Ce), fluorite, nenadkevichite, ancylite-(Ce), synchysite-(Ce), kukharenkoite-(Y), burbankite, calcite, barite, orthoclase (Khibiny massif, Russia); dolomite, calkinsite-(Ce), carbocernaite, khanneshite, barite (Khanneshin 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 Sallanlatvi massifs, and the Vuoriyarvi carbonatite complex, Kola Peninsula. From the Khanneshin 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.

Type Material: The Natural History Museum, London, England, 1971,138; National Museum of Natural History, Washington, D.C., USA, 121683, 162607.

References: (1) Milton, C., B. Ingram, J.R. Clark, and E.J. Dwornik (1965) McKelveyite, a new hydrous sodium barium rare-earth uranium carbonate mineral from the Green River Formation, Wyoming. *Amer. Mineral.*, 50, 593–612. (2) Donnay, G. and J.D.H. Donnay (1971) Ewaldite, a new barium calcium carbonate. *Tschermaks Mineral. Petrog. Mitt.*, 15, 185–200. (3) Chao, G.Y., P.R. Mainwaring, and J. Baker (1978) Donnayite, NaCaSr₃Y(CO₃)₆•3H₂O, a new mineral from Mont Saint-Hilaire, Québec. *Can. Mineral.*, 16, 335–340. (4) Voloshin, A.V., V.V. Subbotin, V.N. Yakovenchuk, Y.A. Pakhomovskii, Y.P. Men'shikov, and A.N. Zaytsev (1990) McKelveyite from carbonatites and hydrothermal metasomatites of Kola Peninsula alkaline rocks (first findings in the USSR). *Zap. Vses. Mineral. Obshch.*, 119(6), 76–86 (in Russian with English abs.).

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise without the prior written permission of Mineral Data Publishing.