

Andersonite

Na₂Ca(UO₂)(CO₃)₃•6H₂O

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Crystal Data: Hexagonal. *Point Group:* $\bar{3}m$. As rhombohedra, pseudocubic or flattened and with complex form development, to 1 cm; typically in crystalline crusts, granular.

Physical Properties: Hardness = n.d. $D(\text{meas.}) = 2.8$ $D(\text{calc.}) = 2.86$ Radioactive; soluble in H₂O; fluoresces bright pale green to yellow-green under SW and LW UV.

Optical Properties: Transparent to translucent. *Color:* Bright green to yellow-green. *Optical Class:* Uniaxial (+). *Pleochroism:* O = colorless; E = pale yellow. $\omega = 1.520$
 $\epsilon = 1.540$

Cell Data: *Space Group:* $R\bar{3}m$ (synthetic). $a = 17.902(4)$ $c = 23.734(4)$ $Z = 18$

X-ray Powder Pattern: Hillside mine, Arizona, USA.

13.0 (10), 7.97 (10), 5.68 (10), 5.22 (10), 3.71 (8), 3.00 (7), 4.35 (6)

Chemistry:

	(1)	(2)
SO ₃	1.6	
CO ₂	19.6	20.50
UO ₃	43.4	44.40
MgO	0.5	
CaO	8.9	8.70
Na ₂ O	9.3	9.62
H ₂ O	[16.7]	16.78
Total	[100.0]	100.00

(1) Hillside mine, Arizona, USA; after deduction of gypsum 3.4%, H₂O by difference; corresponds then to Na_{2.00}(Ca_{0.92}Mg_{0.08})_{Σ=1.00}(UO₂)_{1.01}(CO₃)_{2.97}•5.92H₂O. (2) Na₂Ca(UO₂)(CO₃)₃•6H₂O.

Occurrence: An uncommon secondary mineral, formed in the oxidized zone of uranium-bearing hydrothermal polymetallic deposits; may be post-mine, coating walls of mine tunnels.

Association: Schröckingerite, bayleyite, shwartzite, boltwoodite, liebigite, gypsum.

Distribution: In the USA, in Arizona, from the Hillside mine, about 5.5 km north of Bagdad, Eureka district, Yavapai Co., and in the Cameron area, Coconino Co.; in Utah, in Grand Co., from the Parco No. 23 mine and Skinny No. 1 mine, southeast of Thompsons, with large crystals at the Bumblebee mine, Seven Mile Canyon, and elsewhere; in Emery Co., at the Delta mine; in San Juan Co., large crystals from the Atomic King No. 2 mine, south of Moab, and nearby mines in Cane Wash, and at the Repete mine. In Colorado, from the Deremo-Snyder mine, San Miguel Co.; large crystals found in the Ambrosia Lake district, McKinley Co., New Mexico; at Jim Thorpe, Carbon Co., Pennsylvania. From Myrthengraben, Semmering Pass, Austria. In the Geevor mine, St. Just, Cornwall, England. At Stripa, Västmanland, Sweden. From Rozna and Jáchymov (Joachimsthal), Czech Republic. In the Huemul mine, Malargüe district, Mendoza Province, Argentina.

Name: Honors Charles Alfred Anderson (1902–1990), geologist with the U.S. Geological Survey, who collected the first samples.

Type Material: National Museum of Natural History, Washington, D.C., USA, 106112–106115.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 239. (2) Frondel, C. (1958) Systematic mineralogy of uranium and thorium. U.S. Geol. Sur. Bull. 1064, 115–117. (3) Coda, A., A. Della Giusta, and V. Tazzoli (1981) The structure of synthetic andersonite, Na₂Ca[UO₂(CO₃)₃]•xH₂O ($x \simeq 5.6$). Acta Cryst., 37, 1496–1500. (4) Axelrod, J.M., F.S. Grimaldi, C. Milton, and K.J. Murata (1951) The uranium minerals from the Hillside mine, Yavapai County, Arizona. Amer. Mineral., 36, 1–22.

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