Takovite $\mathbf{Ni_6Al_2(CO_3,OH)(OH)_{16}\cdot 4H_2O}$

Crystal Data: Hexagonal. *Point Group:* [$\overline{3}$ 2/m or 3] (by analogy to the hydrotalcite group). Microcrystalline, platy, to 1 μm; commonly in veinlets and massive.

Physical Properties: Hardness = [∼2] D(meas.) = 2.80 D(calc.) = 2.95

Optical Properties: Translucent. *Color:* Bluish green, yellowish green.
Optical Class: Uniaxial (–). ω = 1.602–1.605 ϵ = 1.594–1.598 2V(meas.) = Small.

Cell Data: *Space Group:* [$R\overline{3}m$ or $R3$] (by analogy to the hydrotalcite group).
a = 3.025–3.028 c = 22.45–22.595 Z = 3/8

X-ray Powder Pattern: Takovo, Serbia; very close to comblainite.
7.566 (10), 3.767 (9), 2.552 (9), 1.917 (9), 2.264 (8), 1.510 (8), 1.481 (8)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
SiO_2	10.17	6.2		Na_2O	0.46		
Al_2O_3	20.16	16.0	12.58	K_2O	0.09		
Fe_2O_3	1.78	1.16		H_2O^+	26.60		
NiO	37.24	41.15	55.31	H_2O^-	3.48		
ZnO		0.03		H_2O		25.38	26.68
MgO		0.45		CO_2	n.d.	11.14	5.43
CaO	0.47	0.11		Total	100.45	101.62	100.00

(1) Takovo, Serbia; quartz 10.17%, goethite 2%, and calcite 0.8% considered as impurities. (2) Agnew, Australia; after deduction of SiO_2 impurity, corresponds to $(Ni_{4.94}Fe_{0.13}Mg_{0.10}Ca_{0.02}Al_{2.81})_{\Sigma=8.00}(OH)_{14.42}(CO_3)_{2.27}\cdot 5.42H_2O$. (3) $Ni_6Al_2(OH)_{16}CO_3\cdot 4H_2O$.

Mineral Group: Hydrotalcite group.

Occurrence: In a karstitic bauxite at the contact of limestone and metamorphosed serpentinite (Takovo, Serbia); an alteration product of nickel sulfides (Western Australia).

Association: Gibbsite, allophane (Takovo, Serbia); glaukosphaerite, népouite, gaspéite, paratacamite, nickeloan magnesite, gypsum, (Kambalda, Australia).

Distribution: From Takovo, Serbia. In the Blangvette West mine, Le Thoronet, Var, France. On Mueo, New Caledonia. In Western Australia, at the Carr Boyd Rocks nickel mine; the Agnew nickel deposit, north of Kalgoorlie; from Kambalda, 56 km south of Kalgoorlie; and the Dordie North nickel deposit. In the USA, at Wells Canyon, Oquirrh Mountains, Utah Co., Utah, and at the Alpine mine, Clear Creek, San Benito Co., California.

Name: For Takovo, Serbia, from which it was first described.

Type Material: National Museum of Natural History, Washington, D.C., USA, 136981.

References: (1) Maksimovíc, Z. (1957) Takovite, a new mineral from Takovo, Serbia. Compt. Rend. Soc. serbe Géol, ann. 1955, 219. (2) (1958) Mineral. Abs., 13, 624 (abs. ref. 1). (3) Maksimovic, Z. (1970) Features and genesis of takovite. Zap. Vses. Mineral. Obshch., 99, 595–600 (in Russian). (4) (1972) Amer. Mineral., 57, 1559 (abs. refs. 1 and 3). (5) Nickel, E.H., C.E.S. Davis, M. Bussell, P.J. Bridge, J.G. Dunn, and R.D. MacDonald (1977) Eardleyite [takovite] as a product of the supergene alteration of nickel sulfides in Western Australia. Amer. Mineral., 62, 449–457. (6) Bish, D.L. and G.W. Brindley (1977) A reinvestigation of takovite, a nickel aluminum hydroxy-carbonate of the pyroaurite group. Amer. Mineral., 62, 458–464. (7) Taylor, H.W.F. (1973) Crystal structures of some double hydroxide minerals. Mineral. Mag., 39, 377–389.