Comblainite $Ni_6Co_2^{3+}(CO_3)(OH)_{16}\cdot 4H_2O$

Crystal Data: Hexagonal. *Point Group:* $\overline{3}$ $2/m$, $3m$, 32, $\overline{3}$, or 3. As cryptocrystalline crusts.

Physical Properties: Hardness = [∼2] D(meas.) = 3.05(2) D(calc.) = 3.16–3.31

Optical Properties: Semitransparent. *Color:* Turquoise-blue; yellow-green in transmitted light.
Optical Class: Uniaxial (–). $\omega = 1.690(2)$ (ω') $\epsilon = 1.684(2)$ (ϵ')

Cell Data: *Space Group:* $R\overline{3}m$, $R3m$, $R32$, $R\overline{3}$, or $R3$. $a = 3.038$ $c = 22.79$ Z = [3/8]

X-ray Powder Pattern: Shinkolobwe, Congo; very close to takovite.
7.64 (100), 2.567 (70), 3.808 (50), 2.278 (50), 1.934 (40), 1.489 (30), 1.519 (20)

Chemistry:

	(1)	(2)
UO_3	4.24	5.20
Co_2O_3	20.80	20.20
NiO	39.30	38.40
MgO	[0.30]	[0.37]
$H_2O^+ + CO_2$	21.29	20.96
H_2O^-	11.59	8.69
H_2O	[1.07]	[1.31]
P_2O_5	[1.05]	[1.29]
Total	[99.64]	[96.42]

(1) Shinkolobwe, Congo; Ni^{2+} and Co^{3+} valences by ESCA spectra; MgO, P_2O_5, and H_2O calculated from UO_3, known to be present as "metasaleeite" $[Mg(UO_2)_2(PO_4)_2\cdot 8H_2O]$; corresponding to $Ni^{2+}_{6.10}Co^{3+}_{2.90}(CO_3)_{1.32}(OH)_{18.27}\cdot 6.7H_2O$. (2) Do.; corresponding to $Ni^{2+}_{6.11}Co^{3+}_{2.89}(CO_3)_{1.02}(OH)_{18.84}\cdot 9.92H_2O$.

Mineral Group: Hydrotalcite group.

Occurrence: An alteration product of nickel and cobalt sulfides in the oxidized zone of a uranium deposit.

Association: Uraninite, "metasaleeite", uranophane, becquerelite, curite, rutherfordine, heterogenite.

Distribution: From Shinkolobwe, Katanga Province, Congo (Shaba Province, Zaire).

Name: For Gordon Comblain (1920–), Royal Museum of Central Africa, Tervuren, Belgium, who discovered the mineral.

Type Material: Royal Museum of Central Africa, Tervuren, Belgium, RGM2224; National Museum of Natural History, Washington, D.C., USA, 147188.

References: (1) Piret, P. and M. Deliens (1980) La comblainite, $(Ni_x^{2+}, Co_{1-x}^{3+})(OH)_2(CO_3)_{(1-x)/2}\cdot yH_2O$, nouveau minéral du groupe de la pyroaurite. Bull. Minéral., 103, 113–117 (in French with English abs.). (2) (1980) Amer. Mineral., 65, 1065–1066 (abs. ref. 1).