Nullaginite $Ni_2(CO_3)(OH)_2$

Crystal Data: Monoclinic. *Point Group:* $2/m$ or 2. Fibers showing felted texture, cross-vein or in ovoid to irregular nodules, to 2 mm.

Physical Properties: Hardness = n.d. VHN = 25–45 (20 g load). D(meas.) = 3.56(4) D(calc.) = 3.66

Optical Properties: Semitransparent. *Color:* Bright green; pale green in transmitted light. *Luster:* Dull, claylike, silky in cross-vein fibers.
Optical Class: Biaxial (–). *Pleochroism:* Weak. *Orientation:* Y or $Z \simeq b$; $X \wedge c = 6°$. *Absorption:* Normal to fiber > along length of fiber. $\alpha = 1.67$ $\beta = 1.78$ $\gamma = 1.78$ 2V(meas.) = n.d.

Cell Data: *Space Group:* $P2_1/m$ or $P2_1$. $a = 9.236(3)$ $b = 12.001(6)$ $c = 3.091(2)$ $\beta = 90.48(7)°$ Z = 4

X-ray Powder Pattern: Otway deposit, Australia.
2.579 (100), 2.557 (90), 4.619 (40), 3.660 (40), 7.30 (30b), 5.038 (30), 1.545 (30)

Chemistry:

	(1)	(2)
CO_2	[21.02]	20.82
Fe_2O_3	0.24	
Cr_2O_3	0.42	
NiO	68.67	70.66
CuO	0.11	
MgO	0.98	
H_2O	[8.56]	8.52
Total	[100.00]	100.00

(1) Otway deposit, Australia; by electron microprobe, average of five determinations, recalculated to 100% from an elemental analysis totaling 89.43% and estimated to contain pecoraite 8.6%, total thought low due to adsorbed H_2O; $(CO_3)^{2-}$ and $(OH)^{1-}$ calculated from stoichiometry; then corresponds to $(Ni_{1.93}Mg_{0.05}Cr_{0.01})_{\Sigma=1.99}(CO_3)(OH)_2$. (2) $Ni_2(CO_3)(OH)_2$.

Mineral Group: Rosasite group.

Occurrence: A rare mineral formed in the oxidation zone of nickel-rich hydrothermal ore deposits.

Association: Magnesian pecoraite, gaspéite, magnetite, "chlorite", nickeloan serpentine (Otway deposit, Australia).

Distribution: From the Otway nickel deposit, near Spinnaway, Nullagine district, and in the 132 North nickel mine, 4 km southwest of Widgiemooltha, Western Australia.

Name: For the Nullagine district, Western Australia, in which the mineral was first found.

Type Material: Western Australian Museum, Perth, Australia, M.76a.1991, M.76b.1991; The Natural History Museum, London, England, 1982,74.

References: (1) Nickel, E.H. and L.G. Berry (1981) The new mineral nullaginite and additional data on the related minerals rosasite and glaukosphaerite. Can. Mineral., 19, 315–324. (2) (1982) Amer. Mineral., 67, 857–858 (abs. ref. 1).