Reevesite $Ni_6Fe_2^{3+}(CO_3)(OH)_{16}\cdot 4H_2O$

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Crystal Data: Hexagonal. *Point Group:* $[\bar{3}\ 2/m]$ (by analogy to pyroaurite). As hexagonal platelets, to 0.1 mm, in fine-grained aggregates.

Physical Properties: Hardness = n.d. D(meas.) = ~2.80–2.88 D(calc.) = 2.78–2.87

Optical Properties: Semitransparent. *Color:* Bright yellow, greenish yellow; golden yellow in thin section.
Optical Class: Uniaxial (–). $\omega = 1.72$–1.735 $\epsilon = 1.63$–1.65

Cell Data: *Space Group:* $R\bar{3}m$. $a = 6.15$–6.164 $c = 45.54$–45.61 $Z = 3/8$

X-ray Powder Pattern: Wolf Creek meteorite.
7.63 (100), 2.60 (81), 3.80 (73), 2.30 (61), 1.946 (48), 1.508 (34), 1.537 (33)

Chemistry:

	(1)	(2)	(3)
SiO_2		1.33	
Fe_2O_3	18.1	20.23	18.40
CoO		0.20	
NiO	52.1	46.22	51.63
MgO		0.61	
H_2O			24.90
CO_2			5.07
Total			100.00

(1) Wolf Creek meteorite; by electron microprobe, partial analysis of maximally nickel-rich material; corresponds to $(Ni_{5.19}Fe^{2+}_{0.14})_{\Sigma=5.33}Fe^{3+}_{2.00}(CO_3)(OH)_{16}\cdot 4H_2O$. (2) Bon Accord, South Africa; by electron microprobe; two partial elemental analyses, here converted to oxides and averaged; corresponds to $(Ni_{5.56}Fe^{2+}_{0.28}Mg_{0.14}Co_{0.02})_{\Sigma=6.00}Fe^{3+}_{2.00}(CO_3)(OH)_{16}\cdot 4H_2O$.
(3) $Ni_6Fe_2(CO_3)(OH)_{16}\cdot 4H_2O$.

Mineral Group: Hydrotalcite group.

Occurrence: An alteration product of a highly weathered iron-nickel meteorite (Wolf Creek meteorite); altered from violarite in nickel ore at a contact between quartzite and ultramafic rocks (Bon Accord, South Africa); on chromatite (Unst, Scotland).

Association: Goethite, nickelian maghemite, jarosite, nickel-rich serpentine, apatite, lipscombite (Wolf Creek meteorite); violarite, ferroan trevorite, willemseite, nimite, "opal", quartz (Bon Accord, South Africa); honessite, hydrohonessite, theophrastite (Unst, Scotland).

Distribution: In the Wolf Creek meteorite. Found three km west of the Scotia talc mine, Bon Accord area, Barberton, Transvaal, South Africa. In the Hagdale quarry, Unst, Shetland Islands, Scotland. From Ca' de Ladri, Emilia-Romagna, Italy. In the USA, on the Victor claim, Clear Creek, San Benito Co., California; in the Fremont district, Hidalgo and Luna Co., New Mexico; and at Barrett Camp, Dragoon Mountains, Cochise Co., Arizona. From the Otway prospect, near Spinnaway, Nullagine district, Western Australia.

Name: To honor Dr. Frank Reeves (1886–?), American geologist who discovered the Wolf Creek meteorite crater.

Type Material: National School of Mines, Paris, France; National Museum of Natural History, Washington, D.C., USA, 119552–119554.

References: (1) White, J.S., Jr., E.P. Henderson, and B. Mason (1967) Secondary minerals produced by weathering of the Wolf Creek meteorite. Amer. Mineral., 52, 1190–1197. (2) De Waal, S.A. and E.A. Viljoen (1971) Nickel minerals from Barberton, South Africa: IV. Reevesite, a member of the hydrotalcite group. Amer. Mineral., 56, 1077–1081. (3) Taylor, H.W.F. (1973) Crystal structures of some double hydroxide minerals. Mineral. Mag., 39, 377–389.

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