Häggite $V_2O_2(OH)_3$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As crystals, to 0.15 mm, acicular, and as flakes; may be intimately intergrown with another vanadium oxide hydrate; massive, in veinlets.

Physical Properties: Hardness = 4.7 D(meas.) = n.d. D(calc.) = [3.51]

Optical Properties: Opaque. *Color:* Black; yellowish gray to dark gray in reflected light. *Optical Class:* Biaxial. *Anisotropism:* Very strong; yellowish gray to bluish gray.
R_1–R_2: (440) 11.7–11.0, (460) 11.8–11.0, (480) 12.0–11.0, (500) 12.3–11.0, (520) 12.3–11.0, (540) 13.0–11.1, (560) 13.4–11.2, (580) 13.7–11.2, (600) 14.0–11.2, (620) 14.3–11.2, (640) 14.6–11.2, (660) 14.9–11.3, (680) 15.2–11.5, (700) 15.6–11.9

Cell Data: *Space Group:* $C2/m$. $a = 12.17(5)$ $b = 2.99(1)$ $c = 4.83(2)$ $\beta = 98°15(5)'$
Z = 2

X-ray Powder Pattern: Carlile, Wyoming, USA.
4.80 (100), 4.05 (50), 3.02 (25), 2.44 (25), 1.959 (18), 3.51 (12), 1.815 (12)

Chemistry:

	(1)	(2)
V_2O_5	99.61	
V_2O_4		44.86
V_2O_3		40.53
H_2O	n.d.	14.61
Total	99.61	100.00

(1) Russia, two localities; by electron microprobe, multiple determinations averaging V = 55.8%, here converted to $V_2^{5+}O_5$. (2) $V^{4+}V^{3+}O_2(OH)_3$.

Occurrence: In the oxidized zone of Colorado Plateau-type U–V deposits.

Association: Doloresite (USA); pyrite, selenium (Russia).

Distribution: In sandstone drill core at a depth of 55 m, from near Carlile, Crook Co., Wyoming; from the Runge mine, near Edgemont, Fall River Co., South Dakota; in the Grants district, McKinley Co., New Mexico; at the Gold Quarry mine, Eureka Co., Nevada, USA. In Russia, at undefined localities in the Voronezh anticline, around Kursk. In the Syr Dar'ya basin, southern Kara-Tau Mountains, Kazakhstan. From an undefined locality in Turkmenistan.

Name: Honors Gunnar Hägg (1903–), chemist and crystallographer, of the University of Uppsala, Uppsala, Sweden.

Type Material: National Museum of Natural History, Washington, D.C., USA, 162623.

References: (1) Evans, H.T., Jr. and M.E. Mrose (1958) The crystal structures of three new vanadium oxide minerals. Acta Cryst., 11, 56–58. (2) Evans, H.T., Jr. and M.E. Mrose (1960) A crystal chemical study of the vanadium oxide minerals, häggite and doloresite. Amer. Mineral., 45, 1144–1166. (3) Ryabeva, Y.G., L.S. Dubakina, A.A. Gorshkov, Z.A. Nekrasova, L.I. Taychikova, and T.A. Khruleva (1978) New data on häggite. Doklady Acad. Nauk SSSR, 243, 1295–1297 (in Russian).