Studtite $UO_4 \cdot 4H_2O$

Crystal Data: Monoclinic, pseudohexagonal. *Point Group:* $2/m$, m, or 2. Needlelike crystals, elongated along [001], to 1 mm, in radial fibrous aggregates and crusts.

Physical Properties: *Tenacity:* Flexible. Hardness = Soft. D(meas.) = 3.58 (synthetic). D(calc.) = 3.64 Radioactive.

Optical Properties: Translucent to transparent. *Color:* Yellow to pale yellow; nearly colorless in transmitted light. *Luster:* Vitreous.
Optical Class: Biaxial (+). *Orientation:* Z = elongation. α = 1.537–1.551 β = 1.555–1.686 γ = 1.680–1.690 2V(meas.) = Small.

Cell Data: *Space Group:* $C2/m$, Cm, or $C2$. a = 11.85(2) b = 6.80(1) c = 4.25(1) $\beta = 93°51(20)'$ Z = 2

X-ray Powder Pattern: Menzenschwand, Germany.
5.93 (10), 3.40 (8), 2.96 (6), 2.23 (6), 2.02 (5), 1.970 (5b), 4.27 (4)

Chemistry: Qualitative microchemical and electron microprobe analyses typically show major U with traces of Pb, H_2O, CO_3 attributed to impurities. Characterization of naturally-occurring material thus rests on equivalence of the X-ray pattern and optical properties with the synthetic compound, and chemical behavior as a peroxide.

Occurrence: A very rare mineral in the oxidized zone of some uranium-bearing mineral deposits.

Association: Uranophane, rutherfordine, lepersonnite (Shinkolobwe, Congo); billietite, uranophane, rutherfordine, barite, quartz, hematite, "limonite" (Menzenschwand, Germany); tengchongite, calcurmolite, kivuite (Tengchong Co., China).

Distribution: From Shinkolobwe, Katanga Province, Congo (Shaba Province, Zaire). At Menzenschwand, Black Forest, Germany. From Mitterberg, Salzburg, Austria. In France, at Davignac, Corrèze, and from the Mas-d'Alary uranium deposit, three km south-southeast of Lodève, Hérault. In Tengchong Co., and at Tongbiguan village, Yingjiang Co., Yunnan Province, China.

Name: To honor Franz Edward Studt, geologist, who published a geological map of Shaba (Katanga) Province in 1913.

Type Material: n.d.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 275. (2) Walenta, K. (1974) On studtite and its composition. Amer. Mineral., 59, 166–171. (3) Zhi-Xiong Wang,Tian-Zhu Zeng, and Jin-Shiu Yin (1979) Discovery of studtite in China. K'o Hsueh T'ung Pao, 24(10), 453–454 (in Chinese). (4) (1979) Chem. Abs., 91, 164 (abs. ref. 3). (5) Deliens, M. and P. Piret (1983) Metastudtite, $UO_4 \cdot 2H_2O$, a new mineral from Shinkolobwe, Shaba, Zaire. Amer. Mineral., 68, 456–458.