

Crystal Data: Tetragonal. *Point Group:* $4/m\ 2/m\ 2/m$ or 422. As rectangular tabular crystals, exhibiting {001}, {111}, {110}, {011}, rarely pyramidal; as foliated or scaly aggregates.

Physical Properties: *Cleavage:* Perfect on {001}; indistinct on {010}. Hardness = 2–2.5 D(meas.) = 3.35–3.55 D(calc.) = 3.31 Radioactive. Fluoresces yellowish green under UV. Dehydrates irreversibly from autunite under ambient conditions.

Optical Properties: Translucent to opaque. *Color:* Lemon-yellow to greenish yellow, yellowish green, dark green. *Luster:* Pearly to dull.

Optical Class: Uniaxial (–), anomalously biaxial (–). *Pleochroism:* X = colorless to pale yellow; Y = Z = dark yellow. *Orientation:* Z = c. *Dispersion:* $r > v$, strong. $\omega = 1.600\text{--}1.611$ $\epsilon = 1.594\text{--}1.598$ $\alpha = 1.596\text{--}1.604$ $\beta = 1.602\text{--}1.622$ $\gamma = 1.603\text{--}1.630$ $2V(\text{meas.}) = 5\text{--}20^\circ$

Cell Data: *Space Group:* $P4/nmm$ or $P4_22_2$. $a = 6.99$ $c = 8.46$ $Z = 1$

X-ray Powder Pattern: Les Oudots mine, Saône-et-Loire, France. (ICDD 39-1351). 8.46 (100), 3.620 (60), 2.115 (35), 2.615 (30), 1.601 (25), 5.39 (20), 4.233 (20)

Chemistry: (1) The mineral usually analyzed as autunite; meta-autunite I contains 6H₂O; meta-autunite II contains 2H₂O and probably does not occur in nature.

Mineral Group: Meta-autunite group.

Occurrence: A secondary mineral, formed as dehydration pseudomorphs after autunite.

Association: Autunite.

Distribution: Widespread. All autunite (q.v.) localities probably contain meta-autunite.

Name: The prefix *meta* indicates the dehydration product of *autunite*.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 984–987 [meta-autunite I]. (2) Frondel, C. (1958) Systematic mineralogy of uranium and thorium. U.S. Geol. Survey Bulletin 1064, 205–207. (3) Leo, G.W. (1960) Autunite from Mt. Spokane, Washington. Amer. Mineral., 45, 99–128. (4) Makarov, E.S. and V.I. Ivanov (1960) Crystal structure of metaautunite. Doklady Acad. Nauk SSSR, 132, 673–676 (in Russian). (5) Takano, Y. (1961) X-ray study of autunite. Amer. Mineral., 46, 812–822. (6) Ross, M. (1963) The crystallography of meta-autunite (I). Amer. Mineral., 48, 1389–1393.