Jurbanite $Al(SO_4)(OH)\cdot 5H_2O$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As short prismatic crystals, dominated by {110} and {011}, to 0.3 mm; commonly in stalactites and crusts.

Physical Properties: *Tenacity:* Brittle. Hardness = ~2.5 D(meas.) = 1.786(8) D(calc.) = 1.828 Soluble in H_2O.

Optical Properties: Transparent. *Color:* Colorless. *Luster:* [Vitreous.] *Optical Class:* Biaxial (–). *Orientation:* $Y = b$; $Z \wedge a = -5°$. $\alpha = 1.459(2)$ $\beta = 1.473(2)$ $\gamma = 1.483(2)$ 2V(meas.) = 80° 2V(calc.) = 80°

Cell Data: *Space Group:* $P2_1/n$. $a = 8.3965(6)$ $b = 12.479(2)$ $c = 8.1549(9)$ $\beta = 101.917(6)°$ Z = 4

X-ray Powder Pattern: San Manuel mine, Arizona, USA.
3.723 (100), 4.013 (90), 6.80 (80b), 4.954 (80), 4.494 (80), 5.74 (70), 3.922 (70)

Chemistry: (1) San Manuel mine, Arizona, USA; qualitative emission spectroscopy confirmed major Al and very minor Fe, Mg, Mn, Si, Cu and Ca; stoichiometry established by the congruity of X-ray diffraction patterns of natural and synthetic material.

Polymorphism & Series: Dimorphous with rostite.

Occurrence: As rare secondary crusts in humid tunnels in oxidized portions of sulfide deposits in aluminous rocks; apparently deposited directly from mine water at about 27 °C and 100% humidity (San Manuel mine, Arizona, USA).

Association: Epsomite, hexahydrite, pickeringite, starkeyite (San Manuel mine, Arizona, USA); rostite, gypsum, pickeringite, metavoltine, ferrinatrite, sideronatrite, tamarugite, uklonskovite (Cetine mine, Italy).

Distribution: From the San Manuel mine, Mammoth district, Pinal Co., Arizona, USA. At the Cetine mine, 20 km southwest of Siena, Tuscany, Italy.

Name: Honors Joseph John Urban (1915–1997), Tucson, Arizona, USA, mineral collector who first observed the natural material.

Type Material: National Museum of Natural History, Washington, D.C., USA, 144003.

References: (1) Anthony, J.W. and W.J. McLean (1976) Jurbanite, a new post-mine aluminum sulfate mineral from San Manuel, Arizona. Amer. Mineral., 61, 1–4. (2) Sabelli, C. (1985) Refinement of the crystal structure of jurbanite, $Al(SO_4)(OH)\cdot 5H_2O$. Zeits. Krist., 173, 33–39.