Plumbojarosite $Pb_{0.5}Fe_3^{3+}(SO_4)_2(OH)_6$

Crystal Data: Hexagonal. *Point Group:* $\overline{3}\ 2/m$. As hexagonal crystals, platy on {0001}, with $\{10\overline{1}4\}$, $\{01\overline{1}2\}$, to 0.1 mm; commonly aggregated into crusts and compact masses, pulverulent, earthy.

Physical Properties: *Cleavage:* On $\{10\overline{1}4\}$, fair. *Tenacity:* Talclike. Hardness = "Soft". D(meas.) = 3.64–3.67 D(calc.) = [3.66]

Optical Properties: Semitransparent. *Color:* Golden brown to dark brown. *Luster:* Vitreous, silky to dull.
Optical Class: Uniaxial (–). *Pleochroism:* O = yellow-brown; E = nearly colorless. $\omega = 1.875$ $\epsilon = 1.786$

Cell Data: *Space Group:* $R\overline{3}m$. $a = 7.305$–7.315 $c = 33.564$–33.788 Z = 6

X-ray Powder Pattern: Cookes Peak district, New Mexico, USA.
3.066 (100), 5.933 (94), 1.829 (70), 3.114 (46), 1.976 (45), 6.232 (34), 3.657 (31)

Chemistry:

	(1)	(2)
SO_3	27.06	28.33
SiO_2	0.51	
Al_2O_3	0.10	
Fe_2O_3	42.37	42.37
CuO	0.27	
PbO	19.84	19.74
MgO	0.01	
CaO	0.05	
Na_2O	0.21	
K_2O	0.17	
H_2O	9.56	9.56
Total	100.15	100.00

(1) Cookes Peak district, New Mexico, USA. (2) $Pb_{0.5}Fe_3^{3+}(SO_4)_2(OH)_6$

Mineral Group: Alunite group.

Occurrence: Formed by the reaction between galena and oxidizing pyrite in lead deposits, typically in arid regions.

Association: Jarosite, anglesite, "limonite".

Distribution: Uncommon but occurring at many localities, at some constituting an ore of lead. In the USA, from the Cookes [Cooks] Peak district, Luna Co., and many other occurrences in New Mexico; from many localities in Utah, as in the American Forks and East Tintic districts, Utah Co.; at the Boss, Kirby, Yellow Pine, and other mines, Goodsprings district, Clark Co., Nevada; from Tombstone, Cochise Co., and elsewhere in Arizona; at Leadville, Lake Co., Colorado; in the Darwin district, Inyo Co., California. In England, from the Treore mine, St. Teath, the Penberthy Croft mine, St. Hilary, and Wheal Carpenter, Gwinear, Cornwall. At Laurium, Greece. From Bolkardag, Adana Province, Turkey. At Akchagyl, Ukraine. From Tsumeb, Namibia.

Name: As the lead, *plumbum*, analog of *jarosite*.

Type Material: Yale University, New Haven, Connecticut, 3.3608, 3.6809; National Museum of Natural History, Washington, D.C., USA, 86551, R6308.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 568–570. (2) Mumme, W.G. and T.R. Scott (1966) The relationship between basic ferric sulfate and plumbojarosite. Amer. Mineral., 51, 443–453. (3) Jambor, J.L. and J.E. Dutrizac (1983) Beaverite-plumbojarosite solid solutions. Can. Mineral., 21, 101–113. (4) Szymański, J.T. (1985) The crystal structure of plumbojarosite $Pb[Fe_3(SO_4)_2(OH)_6]_2$. Can. Mineral., 23, 659–668.