

# Jianshuiite



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**Crystal Data:** Hexagonal. *Point Group:*  $\bar{3}$  or 3. Very fine granular, to 5  $\mu\text{m}$ , in porous aggregates; massive.

**Physical Properties:** Hardness = Soft.  $D(\text{meas.}) = 3.50\text{--}3.60$   $D(\text{calc.}) = 3.598$

**Optical Properties:** Opaque. *Color:* Brown to brownish black; grayish white in reflected light, with brown internal reflections.

*Optical Class:* Uniaxial. *Anisotropism:* Distinct.

R: (470) 23.0, (546) 19.9, (589) 19.1, (650) 18.6

**Cell Data:** *Space Group:* [ $R\bar{3}$  or  $R3$ ] (by analogy to the chalcophanite group).  $a = [7.54]$   
 $c = [20.82]$   $Z = [6]$

**X-ray Powder Pattern:** Lu Village, China; nearly indistinguishable from chalcophanite and aurorite.

6.965 (100), 2.230 (23), 3.483 (11), 4.086 (8), 2.449 (7), 2.396 (6), 5.539 (3)

## Chemistry:

	(1)	(2)
SiO <sub>2</sub>	1.20	3.94
MnO <sub>2</sub>	67.65	68.49
Al <sub>2</sub> O <sub>3</sub>	0.78	0.91
Fe <sub>2</sub> O <sub>3</sub>	0.52	1.41
MnO	8.02	0.92
MgO	5.29	8.52
CaO	1.97	2.03
H <sub>2</sub> O <sup>+</sup>	13.37	12.60
P <sub>2</sub> O <sub>5</sub>	0.59	1.63
Total	99.39	100.45

(1) Lu Village, China; corresponds to  $(\text{Mg}_{0.51}\text{Mn}_{0.44}^{2+}\text{Ca}_{0.08})_{\Sigma=1.03}\text{Mn}_{3.03}^{4+}\text{O}_{7.10} \cdot 2.90\text{H}_2\text{O}$ . (2) Do.; corresponds to  $(\text{Mg}_{0.85}\text{Mn}_{0.05}^{2+}[\text{Ca}_{0.08}])_{\Sigma=0.98}\text{Mn}_{3.15}^{4+}\text{O}_{7.20} \cdot 2.80\text{H}_2\text{O}$ .

**Occurrence:** A hypogene mineral in manganese ore (Lu Village, China); authigenic in manganese oxide concretions in siltstone (San Felipe, Mexico).

**Association:** Hydrated manganese oxides (Lu Village, China); magnetite, maghemite, goethite, hematite, calcite, quartz, mica, clay minerals (San Felipe, Mexico).

**Distribution:** In China, near Lu Village, Jianshui Co., Yunnan Province. From 56 km south of San Felipe, Baja California, Mexico.

**Name:** For its occurrence in Jianshui Co., Yunnan Province, China.

**Type Material:** Geology Exhibit Museum, Yunnan; Museum of Geology, Beijing, China.

**References:** (1) Yan Guyian, Zhang Shanghua, Zhao Mingkai, Ding Jianping, and Li Deyu (1992) Jianshuiite: a new magnesium mineral of the chalcophanite group. *Acta Mineral. Sinica*, 12(1), 69–77 (in Chinese with English abs.). (2) (1994) *Amer. Mineral.*, 79, 185 (abs. ref. 1). (3) Potter, R.M., and G.R. Rossman (1979) A magnesium analogue of chalcophanite in manganese-rich concretions from Baja California. *Amer. Mineral.*, 64, 1227–1229. (4) Grice, J.D., B. Gartrell, R.A. Gault, and J. Van Velthuisen (1994) Ernie nickelite,  $\text{NiMn}_3\text{O}_7 \cdot 3\text{H}_2\text{O}$ , a new mineral species from the Siberia complex, Western Australia: comments on the chalcophanite group. *Can. Mineral.*, 32, 333–337.