

Manjiroite



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Crystal Data: Tetragonal. *Point Group:* $4/m$. Compact, massive, to 10 cm.

Physical Properties: *Fracture:* Conchoidal. Hardness = n.d. VHN = 181 average.
D(meas.) = 4.29 D(calc.) = [4.45]

Optical Properties: Opaque. *Color:* Dark brownish gray; yellowish gray-white in reflected light. *Streak:* Brownish black. *Luster:* Dull.

Optical Class: Uniaxial. *Anisotropism:* Distinct; yellowish gray, gray, grayish black.

Birefractance: Very weak.

R_1 – R_2 : n.d.

Cell Data: *Space Group:* $I4/m$. $a = 9.916$ $c = 2.864$ $Z = 1$

X-ray Powder Pattern: Kohare mine, Japan.

2.406 (100), 7.017 (98), 3.136 (92), 4.941 (77), 2.160 (69), 1.839 (46), 1.548 (46)

Chemistry:

	(1)		(1)
SiO ₂	0.12	MgO	0.18
MnO ₂	85.79	CaO	0.22
Al ₂ O ₃	0.62	BaO	0.16
Fe ₂ O ₃	0.40	Na ₂ O	2.99
MnO	3.18	K ₂ O	1.39
CoO	0.00	H ₂ O ⁺	3.92
CuO	0.03	H ₂ O [−]	0.68
ZnO	0.03	Total	99.71

(1) Kohare mine, Japan; corresponds to $(\text{Na}_{0.73}\text{K}_{0.22}\text{Ca}_{0.03}\text{Ba}_{0.01})_{\Sigma=0.99}(\text{Mn}_{7.46}^{4+}\text{Mn}_{0.34}^{2+}\text{Al}_{0.09}\text{Fe}_{0.04}\text{Mg}_{0.03})_{\Sigma=7.96}\text{O}_{16} \cdot 1.64\text{H}_2\text{O}$.

Mineral Group: Cryptomelane group.

Occurrence: In the oxidation zone of metamorphosed bedded manganese deposits.

Association: Pyrolusite, nsutite, birnessite, cryptomelane, goethite (Kohare mine, Japan); cryptomelane, pyrolusite, nsutite, romanèchite (Pilbara, Australia).

Distribution: In the Kohare, Tachikawa, Kotamagawa, Kawai, and Takinosawa mines, Iwate Prefecture, Japan. At Bollier, Mary Valley, Queensland, and the Pilbara manganese belt, Western Australia. From the Prompter mine, Tombstone, Cochise Co., Arizona, USA. Found in the Capillitas mine, Veta Balaza, Catamarca, Argentina. From Adams mine, near Kuruman, Cape Province, South Africa.

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Type Material: National Science Museum, Tokyo, Japan, M15748.

References: (1) Nambu, M. and K. Tanida (1967) Manjiroite, a new manganese dioxide mineral, from Kohare Mine, Iwate Prefecture, Japan. *J. Japan. Assoc. Mineral. Petrol. Econ. Geol.*, 58, 39–54 (in Japanese with English abs.). (2) (1968) *Amer. Mineral.*, 53, 2103 (abs. ref. 1). (3) Nambu, M., Ed. (1970) Introduction to Japanese minerals, *Geol. Surv. Japan*, 22, 82–83.