

Miguelromeroite, the Mn analogue of sainfeldite, and redefinition of villyaellenite as an ordered intermediate in the sainfeldite-miguelromeroite series

ANTHONY R. KAMPF*

Mineral Sciences Department, Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, California 90007, U.S.A.

ABSTRACT

Based on single-crystal structure refinements, miguelromeroite, $\text{Mn}_5(\text{H}_2\text{O})_4(\text{AsO}_3\text{OH})_2(\text{AsO}_4)_2$, from the Ojuela mine, Mapimi, Durango, Mexico, is described as a new species corresponding to the Mn-dominant member of a series with sainfeldite, $\text{Ca}_5(\text{H}_2\text{O})_4(\text{AsO}_3\text{OH})_2(\text{AsO}_4)_2$, and type villyaellenite, $(\text{Mn,Ca})\text{Mn}_2\text{Ca}_2(\text{H}_2\text{O})_4(\text{AsO}_3\text{OH})_2(\text{AsO}_4)_2$, from Sainte-Marie aux Mines, Alsace, France, is redefined as an ordered intermediate species in the series.

Miguelromeroite is monoclinic, $C2/c$, $a = 18.030(1)$, $b = 9.2715(5)$, $c = 9.7756(5)$ Å, $\beta = 96.266(2)^\circ$, $V = 1624.4(2)$ Å³, $Z = 4$. At the Ojuela mine, miguelromeroite occurs as a compact spray of orange-pink, prismatic crystals up to 4 cm in length. Crystals are elongate on [001] with forms {100}, {110} and {10 $\bar{1}$ }. Physical properties: pale pink streak, transparent, vitreous luster, brittle, good {100} cleavage, conchoidal fracture, Mohs hardness ~4, measured density 3.69(3) g/cm³, and calculated density 3.714 g/cm³. Optical properties: biaxial (-), $n_\alpha 1.713(2)$, $n_\beta 1.723(2)$, $n_\gamma 1.729(2)$, $2V_{\text{meas}} 70(5)^\circ$, $2V_{\text{calc}} 75^\circ$, orientation $X = b$, $Z \wedge c = 40^\circ$ in obtuse β , pleochroic pale pink, $Z \gg X > Y$. Miguelromeroite is named for Miguel Romero Sanchez (1926–1997) in recognition for his dedication to documenting and preserving Mexico's rich mineral heritage.

Miguelromeroite also occurs at the Veta Negra mine, Tierra Amarilla, Copiapó Province, Chile, at Sterling Hill, Ogdensburg, Sussex County, New Jersey, and at the Gozaisho mine, Iwaki, Fukushima Prefecture, Honshu Island, Japan. Some material from the Gozaisho mine may correspond to another ordered species in the series with the formula $(\text{Ca,Mn})\text{Mn}_2\text{Ca}_2(\text{H}_2\text{O})_4(\text{AsO}_3\text{OH})_2(\text{AsO}_4)_2$.

Keywords: Miguelromeroite, new mineral, villyaellenite, redefinition, crystal structure, cation ordering, Mapimi (Mexico), Sainte-Marie aux Mines (France)