American Mineralogist, Volume 99, pages 519–524, 2014

Ghiaraite: A new mineral from Vesuvius volcano, Naples (Italy)

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Abstract

In this work we report the first finding of $CaCl_2\beta{\cdot}4H_2O$, long known as a synthetic phase. The mineral, called ghiaraite, was discovered in 2011 in a sample belonging to the Real Museo Mineralogico di Napoli (Italy), that had been collected in 1872 at Vesuvius volcano and stored in a glass sealed vial. It is associated with chlorocalcite ($KCaCl_3$), hematite, sylvite, and halite. The mineral was found inside an ejecta of 5 m in size transported by a lava flow to the locality of Massa di Somma. Here with the ejecta still hot the sample was collected and rapidly stored in a sealed glass vial to preserve it from the atmospheric conditions. Ghiaraite is triclinic, space group $P\bar{1}$, with unit-cell parameters: a = 6.3660(5), b = 6.5914(5), c = 8.5568(6) Å, α = 93.504(6)°, β = 97.778(7)°, γ = 110.557(6)°, V = 330.802(9) Å^3, Z = 2. The calculated density is 1.838 g/cm^3 using the ideal formula and the powder X-ray diffraction data. It occurs as euhedral isometric grains up to 5–6 μm long intimately intermixed with chlorocalcite. The eight strongest reflections in the X-ray powder diffraction pattern [listed as d(Å)(I)(hkl)] are: 2.628(100)(02$\bar{2}$); 2.717(88)(10$\bar{3}$); 4.600(88)(1$\bar{1}$ $\bar{1}$); 2.939(77)(200); 2.204(75)(121), 5.874(73)(100), 6.124(47)(010); 3.569(46)(11$\bar{1}$).

Ghiaraite was approved by the Commission on New Minerals, Nomenclature and Classification with IMA number 2012-072. The mineral was named in honor of Maria Rosaria Ghiara (b. 1948), Head of Real Museo Mineralogico of Napoli and Centro Musei delle Scienze Naturali e Fisiche dell'Università degli Studi di Napoli Federico II for her important work in promoting the scientific research focused on the mineralogy of Vesuvius volcano.

Keywords: Ghiaraite, new mineral, X-ray diffraction, EDS, Vesuvius volcano, calcium tetrahydrate chloride