

Césarferreiraite, $\text{Fe}^{2+}\text{Fe}^{3+}(\text{AsO}_4)_2(\text{OH})_2 \cdot 8\text{H}_2\text{O}$, from Eduardo mine, Conselheiro Pena, Minas Gerais, Brazil: Second arsenate in the laueite mineral group

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ABSTRACT

Césarferreiraite, $\text{Fe}^{2+}\text{Fe}^{3+}(\text{AsO}_4)_2(\text{OH})_2 \cdot 8\text{H}_2\text{O}$, is a new laueite-group mineral (IMA 2012-099) of triclinic symmetry, from Eduardo pegmatite mine, Conselheiro Pena municipality, Minas Gerais, Brazil. Intimately associated minerals are pharmacosiderite, scorodite, and earlier arsenopyrite, and probably césarferreiraite replaces the latter. It occurs as fibrous-to-tabular aggregates up to 2 mm. Single crystals, up to 10 μm long with a thickness of about 1–2 μm , are elongated along [001] and flattened on (100). The fibers have almost rectangular cross-section apparently bound by the {100} and {010} pinacoid forms. Color and streak are pale to greenish yellow. Luster is vitreous; individual crystals are transparent and masses are translucent. Cleavage is distinct, presumably on {010} and {100}. Calculated density is 2.934 g/cm^3 . The mineral is biaxial (+), n (min) = 1.747(3), n (max) = 1.754(3) (589 nm). IR spectrum of césarferreiraite is unique and can be used for the identification of the mineral. Chemical composition ($n = 4$, WDS, calculated for the condition $\text{Fe}^{2+}:\text{Fe}^{3+} = 1:2$, H_2O for the ideal structural formula, wt%) is: FeO 11.50, Fe_2O_3 25.56, CaO 15.41, As_2O_5 33.51, H_2O 26.01, total 100.12. The empirical formula (based on 18 O apfu) is $\text{Fe}_{0.98}^{2+}\text{Fe}_{1.96}^{3+}[(\text{AsO}_4)_{1.79}(\text{PO}_4)_{0.31}](\text{OH})_{1.52} \cdot 8.08\text{H}_2\text{O}$. The strongest eight X-ray powder-diffraction lines [d in Å (I)(hkl)] are: 9.85(95)(010), 6.35(100)(001), 3.671(29)($\bar{1}21$), 3.158(32)($1\bar{3}0$), 2.960(39)($02\bar{2}$), 2.884(35)($\bar{1}31$), 2.680(29)($\bar{2}11$), and 2.540(23)($\bar{2}10$). Unit-cell parameters refined from powder data indexed by analogy with related laueite-group minerals (space group: $P\bar{1}$) are: $a = 5.383(2)$, $b = 10.363(3)$, $c = 6.878(2)$ Å , $\alpha = 96.42(4)$, $\beta = 109.19(3)$, $\gamma = 102.30(2)^\circ$, $V = 347.1(2)$ Å^3 , and $Z = 1$. Gladstone-Dale compatibility is -0.020 (excellent). Césarferreiraite is the arsenate analog of ferrolaueite.

Keywords: Césarferreiraite, new mineral, granitic pegmatite, Conselheiro Pena, Minas Gerais, Brazil, laueite group, iron arsenate