

POTENTIALLY NEW Ba, Fe-MELILITE FROM GURIM ANTICLINE, HATRURIM COMPLEX, ISRAEL

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The potentially new Ba, Fe-melilite ($\text{Ba}_2\text{Fe}^{2+}\text{Si}_2\text{O}_7$) is the first barium mineral belonging to the melilite group. It was found in the veins of coarse-grained andradite-gehlenite-rankinite paralava hosted by gehlenite hornfels of the Hatrurim Complex (Mottled zone), Gurim Anticline, Negev Desert, Israel (SHARYGIN et al., 2008). The type locality is situated in vicinity of Arad city, in the central part of Israel's largest pyrometamorphic rock area, named the Hatrurim Basin.

Ba, Fe-melilite occurs in small enclaves accompanied by other barium minerals, such as fresnoite, walstromite, celsian, zadovite and baryte. Rock-forming minerals of this paralava are titanium-enriched andradite, minerals of the gehlenite-alumoåkermanite series, rankinite, fluorapatite, kalsilite, wollastonite and flamite. In this rock we also found magnetite, cuspidine, gurimite, native copper and perovskite. Secondary minerals are zeolites, tacharanite, afwillite and tobermorite-like Ca-hydrosilicates.

Ba, Fe-melilite usually forms light yellow crystals, app. 10-15 μm in size. Very rarely their size reaches 50 μm . It occurs exclusively in fine-grained aggregates in rankinite and gehlenite together with other barium minerals, such as fresnoite ($\text{Ba}_2(\text{TiO})\text{Si}_2\text{O}_7$), celsian ($\text{BaAl}_2\text{Si}_2\text{O}_8$), zadovite ($\text{BaCa}_6[(\text{SiO}_4)(\text{PO}_4)](\text{PO}_4)_2\text{F}$) and walstromite ($\text{BaCa}_2\text{Si}_3\text{O}_9$). The crystal structure of Ba, Fe-melilite [$a = 8.2334(14) \text{ \AA}$; $c = 5.2854(8) \text{ \AA}$] was refined in space group $P\bar{4}2_1m$ with a final R_1 value of 0.045. The empirical formula of Ba, Fe-melilite is $(\text{Ba}_{1.712}\text{Ca}_{0.250}\text{Sr}_{0.043}\text{Na}_{0.015}\text{K}_{0.011})_{\Sigma 2.031}(\text{Fe}^{2+}_{0.808}\text{Mg}_{0.088}\text{Al}_{0.052}\text{Mn}^{2+}_{0.019}\text{Zn}_{0.015}\text{Fe}^{3+}_{0.004})_{\Sigma 0.986}\text{Si}_{1.985}\text{O}_7$ (calculated based on seven oxygen atoms). The following main bands were observed in the Raman spectrum (cm^{-1}): 129, 168, 238, 272, 308, 411, 469, 585, 611, 635, 669, 702, 823, 912, 970 and 1015.

SHARYGIN, V.V., SOKOL, E.V., VAPNIK, Y. (2008): Russ. Geol. Geoph., 49, 709-726.