Batiferrite $Ba[Ti_2Fe^{3+}_8Fe^{2+}_2]O_{19}$

Crystal Data: Hexagonal. *Point Group*: 6/*m* 2/*m* 2/*m*. As hexagonal plates to 1 mm, flattened on {00*1} to 125 μm and also showing {10*3} and {10*0}.

Physical Properties: *Cleavage*: Good on {00*1}. *Tenacity*: Brittle. *Fracture*: Not distinctive. Hardness = ~6 VHN = 710-841, 793 average (50 g load). D(meas.) = n.d. D(calc.) = 5.016 Ferromagnetic.

Optical Properties: Opaque. *Color*: Black, pale gray in reflected light. *Streak*: Dark brown. *Luster*: Submetallic.
Optical Class: *Anisotropism*: Moderate. *Bireflectance*: Distinct in air, weak in oil. Nonpleochroic. Straight extinction parallel to (0001).
R_1-R_2: (470) 22.1-20.1 $(8.4\text{-}7.1)_{oil}$, (546) 21.0-19.4 $(7.8\text{-}6.6)_{oil}$, (589) 20.2-18.8 $(7.4\text{-}6.3)_{oil}$, (650) 19.3-18.3 $(6.8\text{-}5.9)_{oil}$

Cell Data: *Space Group*: $P6_3/mmc$. a = 5.908(2) c = 23.39(1) Z = 2

X-ray Powder Pattern: Western Eifel area, Germany.
2.631 (100), 2.799 (80), 1.478 (70), 2.429 (60), 1.672 (50), 1.638 (40), 1.490 (40)

Chemistry:

	(1)
K_2O	0.30
Na_2O	0.18
SrO	0.53
BaO	11.89
MgO	1.38
Al_2O_3	0.32
TiO_2	13.38
MnO	2.44
FeO	[5.71]
Fe_2O_3	[62.61]
Total	98.74

(1) Western Eifel area, Germany; average electron microprobe analysis, ferrous-ferric iron calculated for charge balance; corresponds to $(Ba_{0.84}Na_{0.06}K_{0.06}Sr_{0.05})_{\Sigma=1.01}(Fe^{3+}_{8.48}Fe^{2+}_{0.86}Ti_{1.82}Mg_{0.37}Mn_{0.37}Al_{0.06})_{\Sigma=11.96}O_{19}$.

Mineral Group: Magnetoplumbite group, hawthorneite subgroup.

Occurrence: In cavities within melilite- and leucite-nephelinite basalts.

Association: Hematite, magnetite, titanite, götzenite, clinopyroxene, nepheline, biotite.

Distribution: In the Slabik company quarry, Üdersdorf, 5 km south-southwest of Daun, the Stolz quarry, Graulai, 1 km north-northeast of Lammersdorf, and at Altburg, 1.5 km west of Schalkenmehren, western Eifel region, Germany.

Name: Reflects the essential *ba*rium and *ti*tanium and relationship to the hexa*ferrite*s.

Type Material: Institute for Mineralogy and Crystallography, University of Vienna, and the Natural History Museum, Vienna, Austria.

References: (1) Lengauer, C.L., E. Tillmanns, and G. Hentschel (2001) Batiferrite, $Ba[Ti_2Fe_{10}]O_{19}$, a new ferrimagnetic magnetoplumbite-type mineral from the Quaternary volcanic rocks of the western Eifel area, Germany. Mineral. Petrology, 71, 1-19. (2) (2001) Amer. Mineral., 86, 1112 (abs. ref. 1). (3) Holtstam, D. and U. Hålenius (2020) Nomenclature of the magnetoplumbite group. Mineral. Mag., 84, 376-380.