Jeppeite $(K, Ba)_2(Ti, Fe^{3+})_6O_{13}$

Crystal Data: Monoclinic. *Point Group:* $2/m$. In finely prismatic to acicular single crystals, elongated along [010], to 1 cm, showing {100}, {20$\overline{1}$}, and {010}, typically overgrown on priderite.

Physical Properties: *Cleavage:* Perfect on {100}; good on {20$\overline{1}$}. *Tenacity:* Brittle. Hardness = 5–6 VHN = 664–773 $\perp$ [010] (100 g load). D(meas.) = 3.94 D(calc.) = 3.972

Optical Properties: Opaque. *Color:* Black; gray in reflected light, may have pale golden internal reflections. *Streak:* Pale brown. *Luster:* Submetallic.
Optical Class: Biaxial. *Pleochroism:* X = Capri blue; Y = dark greenish brown to almost opaque; Z = dark olive-buff. *Orientation:* $X \wedge a = 10°$; $Y = b$; $Z = c$. *Absorption:* $Y > Z > X$. α = [2.13] β = [2.21] γ = [2.35] 2V(meas.) = n.d. *Bireflectance:* Weak.
R_1–R_2: (400) 16.1–19.5, (420) 15.5–18.9, (440) 15.0–18.4, (460) 14.5–18.0, (480) 14.2–17.6, (500) 13.9–17.3, (520) 13.6–17.0, (540) 13.4–16.8, (560) 13.2–16.6, (580) 13.1–16.5, (600) 13.0–16.4, (620) 12.9–16.2, (640) 12.9–16.2, (660) 12.9–16.1, (680) 12.8–16.0, (700) 12.8–16.0

Cell Data: *Space Group:* $C2/m$. a = 15.453(2) b = 3.8368(7) c = 9.123(2) $\beta = 99.25(1)°$ Z = 2

X-ray Powder Pattern: Wolgidee Hills, Western Australia.
3.07 (10), 2.990 (10), 2.812 (10), 1.919 (8), 2.091 (6), 2.074 (6), 1.412 (5)

Chemistry:

	(1)	(2)
TiO_2	69.29	68.01
ZrO_2		0.00
Fe_2O_3	4.74	4.94
MgO		0.47
BaO	17.35	16.93
SrO		0.50
Na_2O		0.50
K_2O	8.47	8.54
Total	99.85	99.89

(1) Wolgidee Hills, Western Australia; by electron microprobe, average of seven analyses, Fe confirmed by magnetic measurements as Fe^{3+}; corresponding to $(K_{1.15}Ba_{0.73})_{\Sigma=1.88}(Ti_{5.56}Fe^{3+}_{0.38})_{\Sigma=5.94}O_{13}$. (2) Do; by electron microprobe, corresponding to $(K_{1.17}Ba_{0.71}Na_{0.10}Mg_{0.08}Sr_{0.03})_{\Sigma=2.09}(Ti_{5.47}Fe^{3+}_{0.40})_{\Sigma=5.87}O_{13}$.

Occurrence: In some abundance, in a large weathered lamproite plug.

Association: Priderite, celadonite, chlorite, titanite, shcherbakovite, wadeite, perovskite, apatite, richterite, calcite.

Distribution: In the Wolgidee Hills, West Kimberley district, Western Australia.

Name: For Dr. John Frederik Biccard Jeppe (1920–), geologist of Nedlands, Western Australia, discoverer of the mineral.

Type Material: Western Australian Musesum, Perth, Australia, MDC6401; The Natural History Museum, London, England, 1983,604–609 and E.870–871.

References: (1) Pryce, M.W., L.C. Hodge, and A.J. Criddle (1984) Jeppeite, a new K–Ba–Fe titanate from Walgidee [*sic*] Hills, Western Australia. Mineral. Mag., 48, 263–266. (2) Bagshaw, A.N., B.H. Doran, A.H. White, and A.C. Willis (1977) Crystal structure of a natural potassium-barium hexatitanite [jeppeite] isostructural with $K_2Ti_6O_{13}$. Aust. J. Chem., 30, 1195–1200. (3) (1985) Amer. Mineral., 70, 872–873 (abs. refs. 1 and 2). (4) Birch, W.D. (1985) A note on large crystals of priderite, jeppeite, wadeite and other minerals from Walgidee [Wolgidee] Hills, Western Australia. Australian Mineralogist, 50, 298–302.