

Jeppelite

(K, Ba)₂(Ti, Fe³⁺)₆O₁₃

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

Physical Properties: *Cleavage:* Perfect on {100}; good on {20 $\bar{1}$ }. *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. $\alpha = [2.13]$ $\beta = [2.21]$ $\gamma = [2.35]$ 2V(meas.) = n.d. *Birefractance:* Weak.

R₁–R₂: (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)
 $\beta = 99.25(1)^\circ$ 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 ₂ O ₃	4.74	4.94
MgO		0.47
BaO	17.35	16.93
SrO		0.50
Na ₂ O		0.50
K ₂ O	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 Fe³⁺; corresponding to (K_{1.15}Ba_{0.73}) $\Sigma=1.88$ (Ti_{5.56}Fe_{0.38}) $\Sigma=5.94$ O₁₃. (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_{0.40}) $\Sigma=5.87$ O₁₃.

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 Museum, 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) Jeppelite, a new K–Ba–Fe titanate from Wolgidee [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 [jeppelite] isostructural with K₂Ti₆O₁₃. *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, jeppelite, wadeite and other minerals from Wolgidee [Wolgidee] Hills, Western Australia. *Australian Mineralogist*, 50, 298–302.

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