Kinoshitalite $(Ba,K)(Mg,Mn,Al)_3Si_2Al_2O_{10}(OH)_2$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Forms small scales, < 1 mm.

Physical Properties: *Cleavage:* {001}, perfect. *Tenacity:* Brittle. Hardness = 2.5–3
D(meas.) = 3.30 D(calc.) = 3.33

Optical Properties: Semitransparent. *Color:* Yellow-brown to colorless; light yellow to colorless in thin section. *Luster:* Vitreous.
Optical Class: Biaxial (–). *Pleochroism:* X = very light yellow to light yellow; $Y = Z$ = light yellow with brownish tinge. *Absorption:* $Y \simeq Z > X$. $\alpha = 1.619$ $\beta = 1.628$–1.633 $\gamma = 1.635$
2V(meas.) = 23°

Cell Data: *Space Group:* $C2/m$. $a = 5.345(3)$ $b = 9.250(4)$ $c = 10.256(8)$
$\beta = 99.99(6)°$ Z = 2

X-ray Powder Pattern: Noda-Tamagawa mine, Japan.
3.37 (100), 2.52 (55), 2.020 (55), 5.05 (50), 10.1 (45), 1.684 (15), 3.16 (5)

Chemistry:

	(1)	(2)		(1)	(2)
SiO_2	24.58	23.43	BaO	17.85	27.60
TiO_2	0.16		Na_2O	0.68	0.11
Al_2O_3	22.06	19.25	K_2O	3.30	0.24
Fe_2O_3	0.71	1.87	F	0.21	
Mn_2O_3	3.24		H_2O^+	2.90	
FeO	0.04		H_2O^-	0.20	
MnO	7.38	2.62	H_2O		3.50
MgO	16.60	21.95	$-O = F_2$	0.09	
CaO	0.05	0.05	Total	99.87	100.62

(1) Noda-Tamagawa mine, Japan; corresponds to $(Ba_{0.58}K_{0.35}Na_{0.11}Ca_{0.01})_{\Sigma=1.05}(Mg_{2.06}Mn^{2+}_{0.52}Al_{0.22}Mn^{3+}_{0.21}Fe^{3+}_{0.04}Ti_{0.01})_{\Sigma=3.06}Si_{2.05}Al_{1.94}O_{10}[(OH)_{1.62}O_{0.33}F_{0.06}]_{\Sigma=2.01}$. (2) Netra, India; by electron microprobe, total Fe as Fe_2O_3; corresponding to $(Ba_{0.93}K_{0.03}Na_{0.02}Ca_{0.01})_{\Sigma=0.99}(Mg_{2.80}Mn_{0.19}Fe_{0.08})_{\Sigma=3.07}Si_{2.01}(Al_{1.94}Fe_{0.05})_{\Sigma=1.99}O_{10}(OH)_2$.

Polymorphism & Series: 1M, $2M_1$ polytypes.

Mineral Group: Mica group.

Occurrence: In hausmannite-tephroite ore (Noda-Tamagawa mine, Japan); in manganese-rich rocks invaded by silicic pegmatite and carbonate veins (Netra, India).

Association: Hausmannite, tephroite, celsian, quartz, spessartine, rhodonite, chalcopyrite, pyrrhotite, rhodochrosite, hübnerite, sonolite (Noda-Tamagawa mine, Japan); braunite, hausmannite, bixbyite, alkalic feldspar, hematite, calcite, dolomite, quartz (Netra, India).

Distribution: In the Noda-Tamagawa mine, Iwate Prefecture, and at Hokkejino, Kyoto Prefecture, Japan. From Netra, Balaghat district, Madhya Pradesh, India. On Trumbull Peak, near Incline, Mariposa Co., California, USA. From Långban, Värmland, Sweden.

Name: For Dr. Kameki Kinoshita (1896–1974), investigator of ore deposits in Japan.

Type Material: National Science Museum, Tokyo, Japan, M19511; National School of Mines, Paris, France.

References: (1) Yoshii, M., K. Maeda, T. Kato, T. Watanabe, S. Yui, A. Kato, and K. Nagashima (1973) Kinoshitalite, a new mineral from the Noda-Tamagawa mine, Iwate Prefecture. Chigaku Kenkyu (Geosci. Mag.), 24, 181–190 (in Japanese). (2) (1975) Amer. Mineral., 60, 486–487 (abs. ref. 1). (3) Kato, T., Y. Miúra, M. Yoshii, and K. Maeda (1979) The crystal structures of 1M-kinoshitalite, a new barium brittle mica and 1M-manganese trioctahedral micas. Mineral. J. (Japan), 9, 392–408. (4) Dasgupta, S., S. Chakraborti, P. Sengupta, P.K. Bhattacharya, H. Banerjee, and M. Fukuoka (1989) Compositional characteristics of kinoshitalite from the Sausar group, India. Amer. Mineral., 74, 200–202.