Bicchulite $Ca_2Al_2SiO_6(OH)_2$

Crystal Data: Cubic. *Point Group:* $\bar{4}3m$. As an extremely fine powder.

Physical Properties: Hardness = n.d. D(meas.) = n.d. D(calc.) = 2.813 (synthetic).

Optical Properties: Semitransparent. *Color:* White or gray; colorless in thin section.
Luster: Powdery, earthy.
Optical Class: Isotropic. $n = 1.625$

Cell Data: *Space Group:* $I\bar{4}3m$. $a = 8.82$–8.83 $Z = 4$

X-ray Powder Pattern: Fuka, Japan.
2.786 (100), 2.753 (95), 3.60 (90), 2.597 (50), 1.559 (50), 3.04 (40), 2.96 (40)

Chemistry:

	(1)	(2)	(3)
SiO_2	28.51	23.77	20.56
TiO_2	0.09	0.92	
Al_2O_3	21.79	23.59	34.89
Fe_2O_3	2.66	6.72	
FeO	0.25	0.20	
MnO	0.03	0.02	
MgO	2.72	2.00	
CaO	35.26	36.89	38.38
Na_2O	0.25	0.14	
K_2O	0.18	0.11	
H_2O^+	8.03	4.79	6.17
H_2O^-	0.43	0.40	
P_2O_5	0.02	0.02	
Total	100.22	99.57	100.00

(1) Fuka, Japan; mixed with vesuvianite. (2) Do.; contaminated by small amounts of gehlenite, vesuvianite, and hydrogrossular. (3) $Ca_2Al_2SiO_6(OH)_2$.

Polymorphism & Series: Dimorphous with kamaishilite.

Occurrence: In skarns in limestones, formed through alteration of gehlenite subjected to later retrograde hydration reactions.

Association: Vesuvianite, hydrogrossular, gehlenite, melilite, calcite.

Distribution: From Fuka, near Bicchu, Okayama Prefecture, and in the Akagané mine, Iwate Prefecture, Japan. At Carneal, Co. Antrim, Ireland.

Name: For Bicchu, the town encompassing the Japanese type locality.

Type Material: Department of Earth Sciences, Okayama University, Okayama, Japan, ONM-01; Institute of Geological Sciences, London, England.

References: (1) Henmi, C., I. Kusachi, K. Henmi, P.A. Sabine, and B.R. Young (1973) A new mineral bicchulite, the natural analogue of gehlenite hydrate, from Fuka, Okayama Prefecture, Japan, and Carneal, County Antrim, Northern Ireland. Mineral. J. (Japan), 7, 243–251.
(2) (1974) Amer. Mineral., 59, 1330 (abs. ref. 1). (3) Sahl, K. and N.D. Chatterjee (1977) The crystal structure of bicchulite, $Ca_2[Al_2SiO_6](OH)_2$. Zeits. Krist., 146, 35–41. (4) Gupta, A.K. and N.D. Chatterjee (1978) Synthesis, composition, thermal stability, and thermodynamic properties of bicchulite, $Ca_2[Al_2SiO_6](OH)_2$. Amer. Mineral., 63, 58–65. (5) Sahl, K. (1980) Refinement of the crystal structure of bicchulite, $Ca_2[Al_2SiO_6](OH)_2$. Zeits. Krist., 152, 13–21.