Kemmlitzite $(Sr,Ce)Al_3(AsO_4)(SO_4)(OH)_6$

Crystal Data: Hexagonal. *Point Group:* $\overline{3}\,2/m$. As pseudocubic rhombohedral crystals, to 0.15 mm, rarely modified by {0001}.

Physical Properties: *Cleavage:* Poor on {0001}. Hardness = 5.5 D(meas.) = 3.63 D(calc.) = 3.601 Low magnetic susceptibility.

Optical Properties: Transparent to translucent. *Color:* Pale gray-brown with a yellow tint, brownish; in transmitted light, colorless to brown-yellow, commonly zoned.
Optical Class: Uniaxial (+). $\omega = 1.701(1)$ $\epsilon = 1.707(1)$

Cell Data: *Space Group:* $[R\overline{3}m]$ (by analogy to beudantite). $a = 7.027(1)$ $c = 16.51(1)$ Z = 3

X-ray Powder Pattern: Kemmlitz, Germany.
2.959 (10), 3.514 (9), 1.903 (9), 2.203 (8), 1.757 (8), 5.71 (7), 1.292 (6)

Chemistry:

	(1)
SO_3	5.99
P_2O_5	5.69
As_2O_5	21.57
SiO_2	2.18
Al_2O_3	27.24
RE_2O_3	12.60
Fe_2O_3	0.78
MgO	0.90
CaO	0.90
SrO	8.27
H_2O	12.04
Total	98.16

(1) Kemmlitz, Germany; RE_2O_3 = Ce_2O_3 57.00%, La_2O_3 26.35%, Nd_2O_3 15.77%, Sm_2O_3 0.88%; AsO_4, SO_4, PO_4, $(OH)^{1-}$, and H_2O confirmed by IR; corresponding to $(Sr_{0.42}RE_{0.40}Mg_{0.12}Ca_{0.08})_{\Sigma=1.02}(Al_{2.79}Fe^{3+}_{0.05})_{\Sigma=2.84}(AsO_4)_{0.98}[(PO_4)_{0.42}(SO_4)_{0.39}(SiO_4)_{0.19}]_{\Sigma=1.00}(OH)_{5.22}\bullet 0.88H_2O$.

Mineral Group: Beudantite group.

Occurrence: In a kaolinized quartz porphyry, in a heavy-fraction separate of undetermined origin as to primary or secondary formation.

Association: Kaolinite, zircon, anatase, apatite, 13 other less-abundant heavy minerals.

Distribution: From the Kemmlitz kaolin deposit, near Oschatz, Saxony, Germany.

Name: For the locality of the first specimens, Kemmlitz, Germany.

Type Material: National Museum, Prague, Czech Republic, 53508; National School of Mines, Paris, France; Harvard University, Cambridge, Massachusetts, USA, 109097.

References: (1) Hak, J., Z. Johan, M. Kvaček, and W. Liebscher (1969) Kemmlitzite, a new mineral of the woodhouseite group. Neues Jahrb. Mineral., Monatsh., 201–212. (2) (1970) Amer. Mineral., 55, 320–321 (abs. ref. 1).