Tschermigite $(NH_4)Al(SO_4)_2 \cdot 12H_2O$

Crystal Data: Cubic. *Point Group:* $2/m\ \overline{3}$. As dominantly octahedral crystals, to 1 cm; also fibrous columnar aggregates, which may be spiral; most commonly powdery.

Physical Properties: *Fracture:* Conchoidal. Hardness = 1.5 D(meas.) = 1.645 D(calc.) = 1.641(1) Soluble in H_2O, sweetish astringent taste.

Optical Properties: Transparent. *Color:* Colorless to white; colorless in transmitted light. *Luster:* Vitreous, silky if fibrous.
Optical Class: Isotropic, may be anomalously birefringent. $n = 1.458$

Cell Data: *Space Group:* $Pa3$. $a = 12.242(1)$ $Z = 4$

X-ray Powder Pattern: Synthetic.
4.327 (100), 4.079 (80), 3.273 (75), 7.07 (55), 5.48 (55), 4.998 (35), 3.691 (35)

Chemistry:

	(1)	(2)
SO_3	35.11	35.32
Al_2O_3	11.57	11.25
MgO	0.13	
Na_2O	0.21	
$(NH_4)_2O$	5.23	5.74
H_2O	47.82	47.69
insol.	0.06	
Total	100.13	100.00

(1) Wamsutter, Wyoming, USA. (2) $(NH_4)Al(SO_4)_2 \cdot 12H_2O$.

Occurrence: An uncommon secondary mineral in lignite and brown coal deposits and bituminous shales and on burning coal seams or waste heaps; as efflorescences around solfataras or geothermal gas vents and fumaroles.

Association: Gypsum, ammoniojarosite, epsomite, rostite, alunogen (shales and coals); boussingaultite, mascagnite, voltaite (The Geysers, California, USA).

Distribution: In the Czech Republic, from Čermníky (Tschermig), east of Kaaden, at Libušín, near Kladno, Zastávka, near Brno, and elsewhere in the brown coal basins near Most and Bílina. From Voinesti, Romania. At Magyarórosbánya, Hungary. In Italy, in the Cetine mine, 20 km southwest of Siena, and at Larderello, Val di Cecina, Tuscany; from the Solfatara di Pozzuoli, Campi Flegri, near Naples, Campania. On the Nyamlagira volcano, near Goma, Kivu Province, Congo (Zaire). In the Te Kopia geothermal field, New Zealand. In the USA, on burning coal waste piles at Glen Lyon, Luzerne Co., and Williamstown, Dauphin Co., Pennsylvania; from The Geysers, Sonoma Co., and at Sulfur Bank, Lake Co., California; from coal deposits about five km south of Wamsutter, Sweetwater Co., Wyoming. A number of additional minor localities are documented.

Name: For the locality near the former Tschermig, Czech Republic.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 475–476 [ammonia alum]. (2) Abdeen, A.M., G. Will, W. Schäfer, A. Kirfel, M.O. Bargouth, K. Recker, and A. Weiss (1981) X-ray and neutron diffraction study of alums. II. The crystal structure of methylammonium aluminium alum. III. The crystal structure of ammonium aluminium alum. Zeits. Krist., 157, 147–166. (3) (1956) NBS Circ 539, 6.