Caminite $Mg_7(SO_4)_5(OH)_4 \cdot H_2O$

Crystal Data: Tetragonal. *Point Group:* $4/m\ 2/m\ 2/m$. As imperfect dipyramidal crystals, to 500 μm; botyroidal.

Physical Properties: *Cleavage:* {001}, good, possible. Hardness = 2.5 D(meas.) = 2.58–2.79 D(calc.) = [2.14]

Optical Properties: Transparent. *Color:* White or colorless; colorless in transmitted light. *Optical Class:* Uniaxial (–). $\omega = 1.534$ $\epsilon = 1.532$

Cell Data: *Space Group:* $I4_1/amd$ (synthetic). $a = 5.242(1)$ $c = 12.995(3)$ Z = 4

X-ray Powder Pattern: East Pacific Rise.
3.345 (100), 3.220 (80), 1.871 (50), 1.620 (25), 2.062 (20), 2.041 (20), 1.854 (20)

Chemistry:

	(1)	(2)
SO_3	52.7	54.35
MgO	37.3	38.31
CaO	trace	
H_2O	[10.0]	7.34
Total	[100.0]	100.00

(1) East Pacific Rise; by electron microprobe, H_2O by difference. (2) $Mg_7(SO_4)_5(OH)_4 \cdot H_2O$.

Occurrence: Formed by the reaction of sea water with hydrothermal fluids in a midocean ridge submarine chimney vent. Unstable below 130° C., below which it hydrates and redissolves in sea water.

Association: Anhydrite.

Distribution: Along the East Pacific Rise at 21° N.

Name: From the Latin *caminus*, for *chimney*, as the mineral occurs in undersea black-smoker chimneys.

Type Material: n.d.

References: (1) Haymon, R.M. and M. Kastner (1986) Caminite: A new magnesium-hydroxide-sulfate-hydrate mineral found in a submarine hydrothermal deposit, East Pacific Rise, 21°N. Amer. Mineral., 71, 819–825. (2) Keefer, K.D., M.F. Hochella, Jr., and B.H.W.S. De Jong (1981) The structure of the magnesium hydroxide sulfate hydrate $MgSO_4.\frac{1}{3}Mg(OH)_2.\frac{1}{3}H_2O$. Acta Cryst., 37, 1003–1006.