Charlesite $Ca_6(Al,Si)_2(SO_4)_2B(OH)_4(OH,O)_{12}\cdot 26H_2O$

Crystal Data: Hexagonal. *Point Group:* $3m$ (probable). Crystals are tabular {0001}, dominated by $\{10\bar{1}4\}$, to 6 mm, may be rounded.

Physical Properties: *Cleavage:* Perfect on $10\bar{1}0$. *Tenacity:* Brittle. Hardness = ∼2.5 D(meas.) = 1.77 D(calc.) = 1.79 Pale violet or pale green fluorescence under SW UV, weaker under LW UV.

Optical Properties: Transparent, may appear opaque due to surficial alteration. *Color:* Colorless, white, pale yellow, pale pink. *Streak:* White. *Luster:* Vitreous to dull. *Optical Class:* Uniaxial (–). $\omega = 1.492(3)$ $\epsilon = 1.475(3)$

Cell Data: *Space Group:* $[P31c]$ (by analogy to ettringite). $a = 11.16(1)$ $c = 21.21(3)$ Z = 2

X-ray Powder Pattern: Franklin, New Jersey, USA.
9.70 (100), 5.58 (80), 3.855 (80), 2.749 (70), 2.538 (70), 2.193 (70), 2.133 (50)

Chemistry:

	(1)
SO_3	12.8
SiO_2	3.1
B_2O_3	3.2
Al_2O_3	5.1
CaO	27.3
H_2O	48.6
Total	100.1

(1) Franklin, New Jersey, USA; corresponds to $Ca_{5.94}(Al_{1.22}Si_{0.63})_{\Sigma=1.85}(SO_4)_{1.95}[B(OH)_4]_{1.12}[(OH)_{10.97}O_{1.03}]_{\Sigma=12.00}\cdot 25.16H_2O$.

Mineral Group: Ettringite group.

Occurrence: Very rare, coating fractures and vugs in a metamorphosed stratiform zinc deposit.

Association: Clinohedrite, ganophyllite, xonotlite, pectolite, prehnite, "Mn-chlorite", roeblingite, willemite, datolite.

Distribution: From Franklin, Sussex Co., New Jersey, USA.

Name: Honors Dr. Charles Palache (1869–1954), eminent American crystallographer and mineralogist, Harvard University, Cambridge, Massachusetts, USA.

Type Material: Harvard University, Cambridge, Massachusetts, 107733; National Museum of Natural History, Washington, D.C., USA, 148689, C6247, C6401.

References: (1) Dunn, P.J., D.R. Peacor, P.B. Leavens, and J.L. Baum (1983) Charlesite, a new mineral of the ettringite group, from Franklin, New Jersey. Amer. Mineral., 68, 1033–1037.