Chaidamuite $(Zn, Fe^{2+})Fe^{3+}(SO_4)_2(OH)\cdot 4H_2O$

Crystal Data: Triclinic, pseudomonoclinic. *Point Group:* 1. As thick tabular to pseudocubic crystals, with {001}, {010}, {011}, and $\{\overline{1}01\}$; as grains or granular aggregates, to < 1 mm.

Physical Properties: *Cleavage:* On {001} and {100}, perfect. *Fracture:* Conchoidal. Hardness = 2.5–3 D(meas.) = 2.722(2) D(calc.) = 2.72

Optical Properties: Translucent. *Color:* Brown to yellow-brown. *Streak:* Pale yellow. *Luster:* Vitreous.
Optical Class: Biaxial (+). *Pleochroism:* Strong; X = pale yellow to colorless; Y = pale yellow; Z = brownish yellow. *Orientation:* $X = b$; $Y \wedge a = 12°$; $Z \wedge c = 28°$. *Dispersion:* $r < v$, strong. $\alpha = 1.632(1)$ $\beta = 1.640(1)$ $\gamma = 1.688(1)$ 2V(meas.) = 44(2)°

Cell Data: *Space Group:* $P1$. $a = 7.309(2)$ $b = 7.202(2)$ $c = 9.691(3)$ $\alpha = 89.64(3)°$ $\beta = 105.89(3)°$ $\gamma = 91.11(2)°$ Z = 2

X-ray Powder Pattern: Xitieshan mine, China.
3.118 (100), 3.090 (95), 9.40 (80), 5.00 (80), 3.64 (70), 5.03 (65), 2.048 (40)

Chemistry:

	(1)	(2)
SO_3	40.63	39.79
SiO_2	0.15	
Al_2O_3	0.12	
Fe_2O_3	20.00	19.84
FeO	2.09	
MnO	0.06	
ZnO	17.00	20.22
Na_2O	0.02	
K_2O	0.01	
H_2O	19.21	20.15
Total	99.29	100.00

(1) Xitieshan mine, China; corresponds to $(Zn_{0.85}Fe^{2+}_{0.12})_{\Sigma=0.97}(Fe^{3+}_{1.01}Al_{0.01})_{\Sigma=1.02}(SO_4)_{2.05}(OH)_{0.90}\cdot 3.87H_2O$. (2) $ZnFe(SO_4)_2(OH)\cdot 4H_2O$.

Occurrence: A secondary mineral in the oxidized portions of a Pb–Zn–Fe sulfide deposit.

Association: Coquimbite, copiapite, butlerite, zincobotryogen.

Distribution: From the Xitieshan Pb–Zn mine, south of Mt. Qilianshan, Chaidamu, Qinghai Province, China.

Name: For the occurrence near Chaidamu, China.

Type Material: Geology Department, Lanzhou University, Lanzhou; Geology and Mineral Resources Museum, Ministry of Geology, Beijing, China.

References: (1) Li Wanmao, Chen Guoying, and Peng Zhizhong (1986) Chaidamuite – a new zinc and ferric sulfate mineral. Acta Mineral. Sinica, 6, 109–113 (in Chinese with English abs.). (2) (1988) Amer. Mineral., 73, 1493 (abs. ref. 1). (3) Li Wanmao and Wang Qiguang (1990) Determination and refinement of the crystal structure of chaidamuite. Science in China, Series B, 33, 623–630.