Xieite FeCr<sub>2</sub>O<sub>4</sub>

**Crystal Data**: Orthorhombic. *Point Group*: 2/m 2/m 2/m. As polycrystalline aggregates to  $40 \mu m$ , commonly as pseudomorphs of chromite crystals or its fragments less than  $1 \mu m$ .

**Physical Properties**: Cleavage: n.d. Tenacity: n.d. Fracture: n.d. Tenacity: n.d.

**Optical Properties**: [Opaque.] *Color*: Light gray in reflected light. *Streak*: n.d. *Luster*: [Metallic.] *Optical Class*: n.d.

R: (470) 19.9, (546) 19.7, (589) 18.6, (650) 17.6

**Cell Data**: *Space Group*: *Bbmm*. a = 9.462(6) b = 9.562(9) c = 2.916(1) Z = 4

## X-Ray Diffraction Pattern: Suizhou meteorite.

2.675 (100), 1.953 (90), 1.566 (60), 1.337 (40), 2.389 (20), 1.439 (15), 1.425 (15)

## Chemistry:

	(1)
MgO	2.47
FeO	29.35
MnO	0.55
$TiO_2$	2.71
$Cr_2O_3$	57.46
$Al_2O_3$	6.07
$V_2O_3$	0.92
Total	99.53

(1) Suizhou meteorite; average electron microprobe analysis supplemented by Raman spectroscopy; corresponding to  $(Fe_{0.87}Mg_{0.13}Mn_{0.01})_{\Sigma=1.01}(Cr_{1.62}Al_{0.25}Ti_{0.08}V_{0.02})_{\Sigma=1.97}O_4$ .

**Polymorphism & Series**: High pressure polymorph of FeCr<sub>2</sub>O<sub>4</sub>.

**Occurrence**: In a shock vein in a L6 chondrite meteorite, formed by solid-state transformation of chromite under shock-induced high pressure and temperature (Suizhou).

**Association**: Ringwoodite, majorite, lingunite, tuite, olivine, pyroxene, chromite (Suizhou); chenmingite, chromite, Fe-Cr-rich ulvöspinel (Tissint).

**Distribution**: In the Suizhou meteorite [TL]. In the Tissint martian meteorite.

**Name**: Honors Professor Xiande *Xie*, former president of the International Mineralogical Association (1990 to 1994) for his contributions to mineralogy and shock effects on minerals.

**Type Material**: Geological Museum, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences.

**References**: (1) Chen, M., J. Shu, and H.K. Mao (2008) Xieite, a new mineral of high-pressure FeCr<sub>2</sub>O<sub>4</sub> polymorph. Chinese Science Bulletin, 53(21), 3341-3345. (2) Ma, C., O. Tschauner, J.R. Beckett, Y. Liu, E. Greenberg, and V.B. Prakapenka (2019) Chenmingite, FeCr<sub>2</sub>O<sub>4</sub> in the CaFe<sub>2</sub>O<sub>4</sub>-type structure, a shock-induced, high-pressure mineral in the Tissint martian meteorite. Amer, Mineral., 104(10), 1521-1525.