Chenmingite $FeCr_2O_4$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. As lamellae (< 1 μm wide and to 4 μm long) within precursor chromite grains.

Physical Properties: *Cleavage*: n.d. *Fracture*: n.d. *Tenacity*: n.d. VHN = n.d.
Hardness = Polishing hardness greater than chromite. D(meas.) = n.d. D(calc.) = 5.27(2)

Optical Properties: Opaque. *Color*: n.d. *Streak*: n.d. *Luster*: n.d.
Optical Class: n.d. Optically not distinguishable from chromite.

Cell Data: Space Group: *Pnma*. *a* = 9.715(6) *b* = 2.87(1) *c* = 9.49(7) Z = 4

X-ray Powder Pattern: Tissint martian meteorite.
2.6724 (100), 2.3867 (49), 2.6374 (37), 2.0713 (28), 1.585 (23), 1.2619 (21), 2.366 (20)

Chemistry:

	(1)	(2)
Cr_2O_3	57.5	67.90
Al_2O_3	7.1	
TiO_2	0.70	
FeO	29	32.10
MgO	4	
MnO	0.62	.
Total	98.92	100.00

(1) Tissint martian meteorite; average of 15 electron microprobe analyses, Fe^{2+}/Fe^{3+} from M_3O_4 stoichiometry; corresponds to $(Fe^{2+}_{0.75}Mg_{0.23}Mn_{0.02})_{\Sigma=1.00}(Cr_{1.60}Al_{0.29}Fe^{3+}_{0.06}Fe^{2+}_{0.04}Ti_{0.02})_{\Sigma=2.01}O_4$.
(2) $FeCr_2O_4$.

Occurrence: Formed by solid-state transformation of precursor chromite, near shock-induced melt pockets, under high pressure and high temperature during the Tissint impact event on Mars.

Association: Chromite, xieite, Fe,Cr-rich ulvöspinel.

Distribution: From the Tissint martian meteorite, an olivine-phyric shergottite.

Name: Honors Ming Chen, a cosmochemist and mineralogist, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, China, for his outstanding contributions to research on high-pressure mineralogy of meteorites, shock metamorphism, and terrestrial impact craters.

Type Material: Meteorite Collection, Frank H. McClung Museum, University of Tennessee, Knoxville, Tennessee, USA (Tissint section UT2).

References: (1) Ma, C., O. Tschauner, J.R. Beckett, Y. Liu, E. Greenberg, and V.B. Prakapenka (2019) Chenmingite, $FeCr_2O_4$ in the $CaFe_2O_4$-type structure, a shock-induced, high-pressure mineral in the Tissint martian meteorite. Amer. Mineral., 104(10), 1521-1525.