Joegoldsteinite $MnCr_2S_4$

Crystal Data: Isometric. *Point Group*: 4/*m* $\bar{3}$ 2/*m*. As grains to 15 μm.

Physical Properties: *Cleavage*: n.d. *Fracture*: n.d. *Tenacity*: n.d. Hardness = n.d.
D(meas.) = n.d. D(calc.) = 3.71

Optical Properties: n.d. *Color*: n.d. *Streak*: n.d. *Luster*: n.d.
Optical Class: n.d. Stated to be similar in color and reflectivity to daubréelite, in reflected light.

Cell Data: Space Group: *Fd*3*m*. *a* = 10.11 Z = 8

X-ray Powder Pattern: Calculated pattern.
3.048 (100), 1.787 (95), 2.528 (58), 1.946 (50), 0.799 (40), 3.574 (34), 1.032 (27)

Chemistry:	(1)	(2)
S	44.3	44.66
Cr	36.2	36.21
Mn	15.8	19.13
Fe	4.5	
Ni	0.09	
Cu	0.08	.
Total	101.0	100.00

(1) Social Circle IVA iron meteorite; average of 4 electron microprobe analyses; corresponds to $(Mn_{0.82}Fe_{0.23})Cr_{1.99}S_{3.95}$. (2) $MnCr_2S_4$.

Mineral Group: Linnaeite group.

Occurrence: In a CV3 carbonaceous chondrite and an iron meteorite.

Association: Daubréelite, chromite (Social Circle IVA iron meteorite); troilite, niningerite (Indarch EH4 enstatite chondrite).

Distribution: From the Social Circle IVA iron meteorite (thick section TK 724) and the Indarch EH4 enstatite chondrite.

Name: Honors Joseph (Joe) I. Goldstein (1939-2015), Distinguished Professor Emeritus of mechanical and industrial engineering and former dean, College of Engineering, University of Massachusetts, Amherst, USA, for his research on iron meteorites, metallographic cooling rates, Fe-Ni phase equilibria, electron microscopy, and microanalysis.

Type Material: University of California meteorite collection, Los Angeles, USA.

References: (1) Isa, J., C. Ma, and A.E. Rubin (2016) Joegoldsteinite: A new sulfide mineral ($MnCr_2S_4$) from the Social Circle IVA iron meteorite. Amer. Mineral., 101, 1217-1221.