ASU-NWA-256 (K539
F. Kuntz
TKW 703.1g

History: (F. Kuntz) Four weathered samples were purchased by Fabien Kuntz from a dealer in Tindouf, Algeria in May of 2021.


Fig. 1 Overview photo of samples (F. Kuntz photo)

Physical characteristics: The samples are dark brown, irregular-shaped and have a wind-ablated, weathered exterior. The interior is a breccia of oxidized metal grains and silicates crosscut by abundant veins of oxidized Fe minerals.

Petrography: Description and classification (A. Love, App): Sample is composed of: completely oxidized FeNi metal, associated veins of FeOH minerals and brecciated anhedral, weakly zoned low-Ca pyroxene, plagioclase, and rare olivine (~1 vol%) and lithic clasts w/ similar mineralogy. Within mineral and lithic clasts: exsolved pyroxene is rare; cataclastic texture is recognizable and contains poorly recrystallized contacts with smaller comminuted matrix; and olivine (<1 vol%) contains poorly-developed reaction coronas. Additional minerals are: merrillite, chromite, rare ilmenite and troilite; and both equant and lath shaped Si polymorphs.

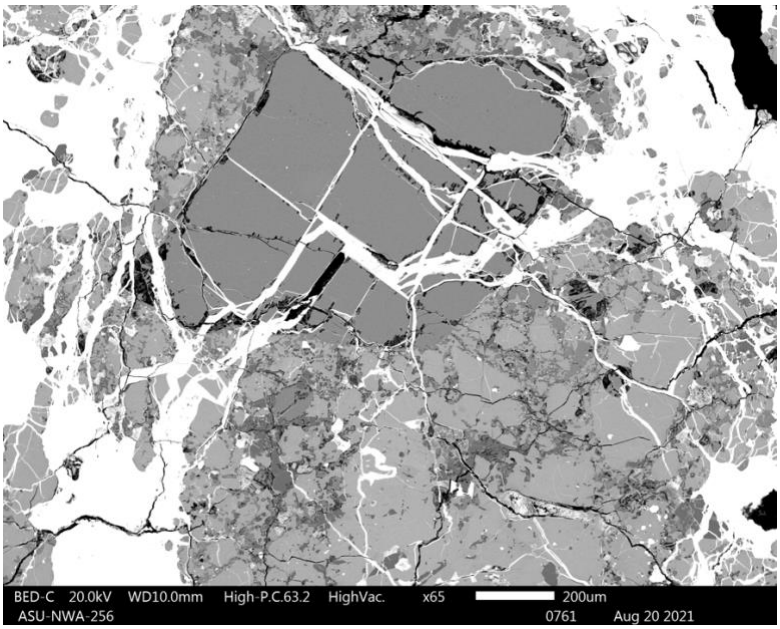

Fig. 2 Backscattered electron image showing recognizable brecciated texture with finer-grained regions containing saturated contacts.

Weathering: Metals are completely oxidized. Sample contains ubiquitous veinlets of oxidized Fe minerals that crosscut the sample.

Geochemistry: (A. Love, App) Geochemistry was measured using the JEOL ITS300 SEM with Oxford XMax EDS in the Dewel Microscopy Lab at Appalachian State University. An accelerating voltage of 20kV was used to analyze 3 spots per grain. Compositions are poorly equilibrated. Olivine (Fa38.1±3.1, Fe/Mn=39.1±2.0, n=3); low Ca pyroxene (Fs30.6±4.4Wo3.5±0.8, Fe/Mn=23.4±3.7, n=24); high Ca pyroxene (Fs18.4±1.7Wo40.1±0.3, Fe/Mn=18.9±0.9, n=3); plagioclase (An94.0±1.2Or0.1±0.1, n=8).

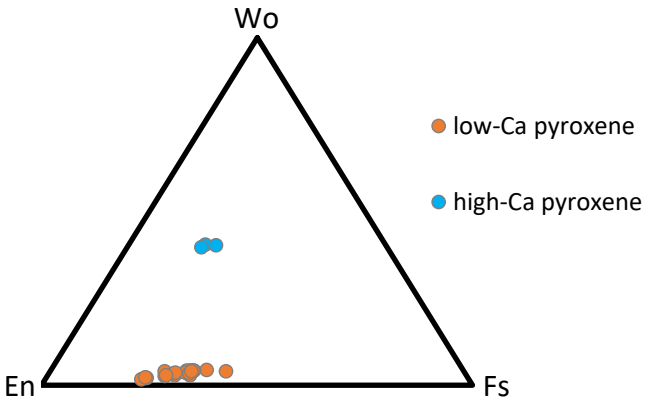

Fig. 3 Pyroxene compositions in sample. Augite occurs as rare blebby exsolution.

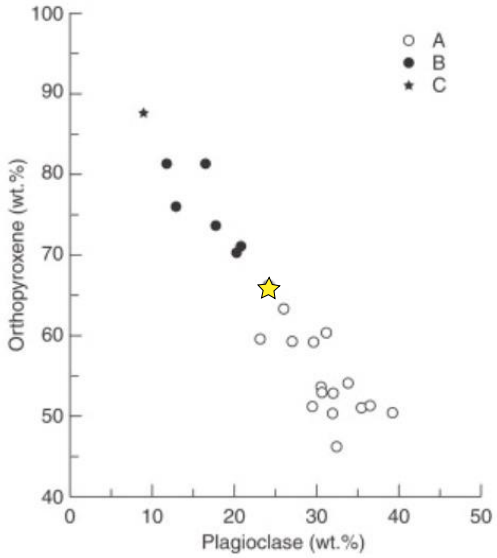

Fig. 4 Mesosiderite class discrimination (after Krot et al., 2007) based on modal abundance of Opx and plagioclase compared to other silicates in sample. Modal abundances were estimated based on image thresholding using Image J processing of 18 BSE images.

Classification: Mesosiderite (estimated class A2). Mesosiderite based on abundance of oxidized metal and brecciated texture of silicates. Class A based on modal abundance of silicates (24 vol% plagioclase, 66 vol% Opx). Metamorphic type 2 based on poorly recrystallized cataclastic texture and reaction coronas around olivine.

Specimens: F. Kuntz holds the main mass. A polished mount and an endcut weighing 38g are on deposit at App.

References: Krot, A.N., Keil, K., Scott, E.R.D., Goodrich, C.A., Weisberg, M.K., 2007. Classification of Meteorites *in* Holland, H.D., and Turekian, K.K., 2007. Treatise on Geochemistry Vol. 1, p. 34.

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