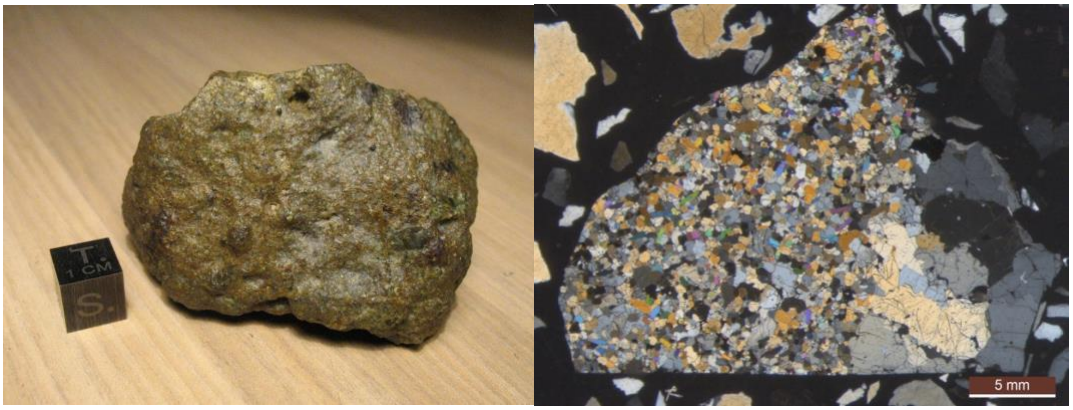
ASU-NWA-277 (K549)
Fabien Kuntz
TKW 159.3g

History: Fabien Kuntz purchased the 159.3g stone from a dealer in Tindouf, Algeria in December of 2021.



Figs. 1 & 2 Overview photo (F. Kuntz) showing green exterior of sample (left); cross polarized light overview of thin section showing dual texture

Physical characteristics: The exterior is greenish brown in color and shows a crystalline texture devoid of fusion crust. The interior is yellowish-green and green colored crystals of two distinct grainsizes.

Petrography: Description and classification (A. Love, App) Sample is composed of coarse-grained (800µm-6mm) allotriomorphic granular-textured orthopyroxene surrounded by finer-grained (avg. grainsize =356µm, n=50) region of equigranular pyroxene with abundant 120º grain boundaries and 64µm (n=14) interstitial rounded to elongate olivine and chadacrysts enclosed within pyroxene (similar to GRA98108). Image thresholding shows sample is composed of (vol%): Opx (85); Ol(9); plag (3); chromite (1) and troilite (1). Fine-grained regions show interstitial troilite while coarse-grained region shows troilite restricted to fractures within grains. Additional minerals are: chromite, plagioclase, troilite.

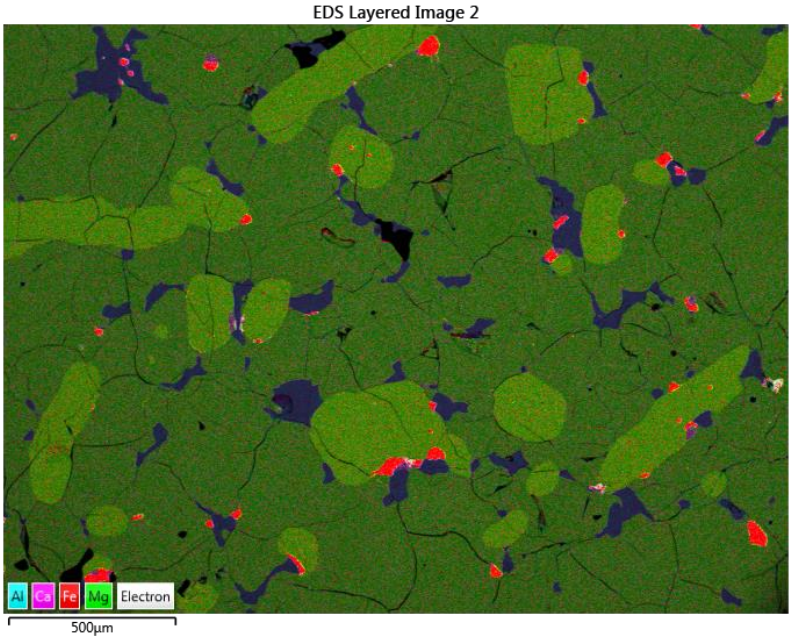


Fig. 3 False-color X-ray map showing consituent phases (dark-green=Opx, lighter green=Ol, blue=plagioclase, red=troilite, light-blue-red speckles=Chr.)

Shock: Undulatory extinction irregular fractures. Coarse grained Opx shows troilite within fractures.

Weathering: The exterior shows patches of calcite.

Geochemistry: (A. Love, App) Geochemistry of both samples 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 equilibrated.

Olivine (Fa27.4±0.5, Fe/Mn=42.6±1.6, n=10); low Ca pyroxene (Fs23.1±0.6Wo3.4±0.5, Fe/Mn=27.5±0.9, Mg#=76.0±0.7, n=12). Plagioclase (An89.5±1.5Or0.3±0.1, n=8).

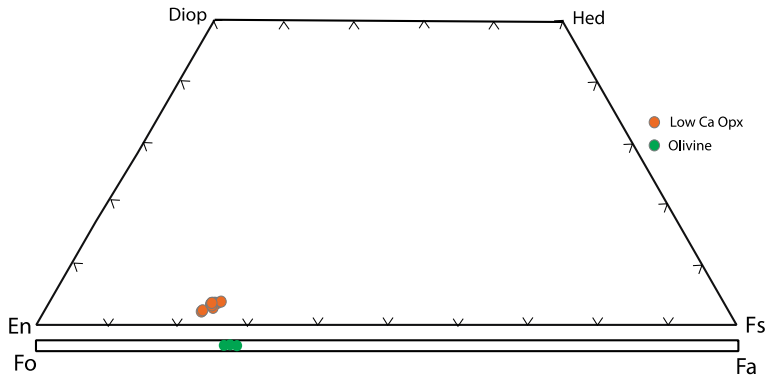


Fig. 4 Pyroxene and olivine compositions of ASU-NWA-277.

Classification: HED achondrite (Diogenite) Based on mineralogy, modal abundance of olivine, Mg# of Fe/Mn ratios of Opx, sample is a diogenite.

Specimens: Fabien Kuntz holds the main mass. A polished thin section and an endcut and slice weighing 20.2g are on deposit at App.

References: Beck, A.W. and McSween, H.Y. Jr, 2010. Diogenites as polymict breccias composed of orthopyroxenite and harzburgite. Meteoritics and Planetary Science V 45., pp. 850-872.