

ASU-NWA-281 (K551)
TKW 646.1g
Fabien Kuntz

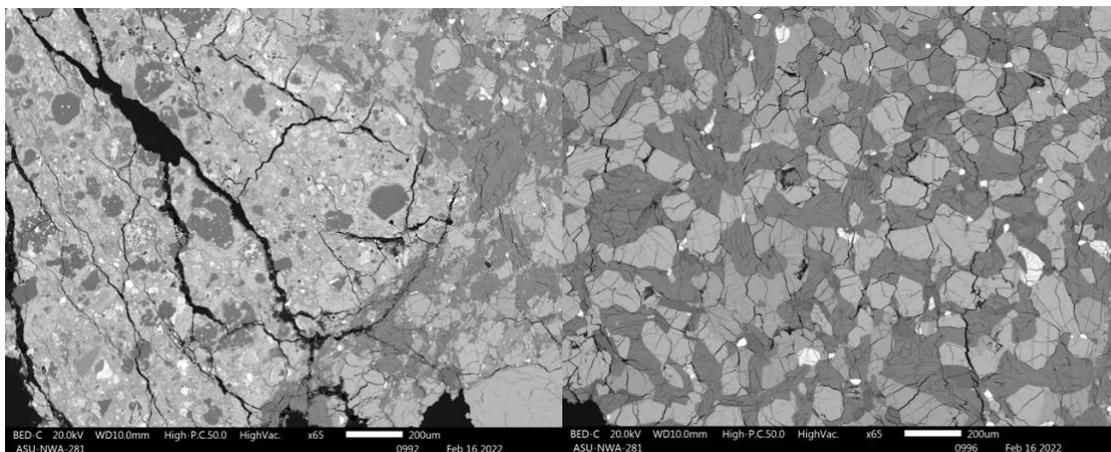
History: Fabien Kuntz purchased a single 646.1g stone from a meteorite dealer in Tindouf, Algeria in Dec. 2021.

Physical Characteristics: Sample is ~50% of sample is coated with a dark brown fusion crust. The brecciated nature of its interior is evident on the fusion crusted face and the trailing face. The cut face shows the interior is a light-colored breccia with occasional dark carbonaceous clasts.



Figs. 1 & 2 Overview photo (F. Kuntz) showing fusion-crusted face (left) and plane polarized thin section overview showing brecciated texture of sample (note dark-carbonaceous clasts, right).

Petrography: Description and classification (A. Love, App) Sample is a polymict breccia composed of a mixture of types of basaltic and cumulate textured eucrite lithic clasts and related mineral fragments. Sample also contains mm-sized carbonaceous chondrite clasts. Rare pyroxenes are crosscut by veins of fayalite. Additional minerals are: Ilmenite, troilite, a silica polymorph, phosphates, chromite, FeNi metal and secondary calcite.



Figs. 3 & 4 Backscattered electron images showing: carbonaceous chondrite clast (left) and cumulate-textured lithic fragment (right).

Shock: Pyroxenes show mechanical twinning and undulatory extinction. Troilite is monocrystalline.

Weathering: FeNi grains are unweathered and some fractures are filled with secondary 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 poorly equilibrated.

low Ca pyroxene (Fs 56.2 ± 7.1 Wo 2.7 ± 1.0 , Mg#29.3-52.3, Fe/Mn=30.3 ± 1.6 , n=16); pigeonite (Fs58.2Wo6.2, Fe/Mn=29.6, n=1); high Ca Pyroxene (Fs27.8 ± 6.7 Wo42.4 ± 4.7 , Fe/Mn=30.3 ± 2.4 , n=12); plagioclase (An91.6 ± 1.1 Or0.3 ± 0.1 , n=8).

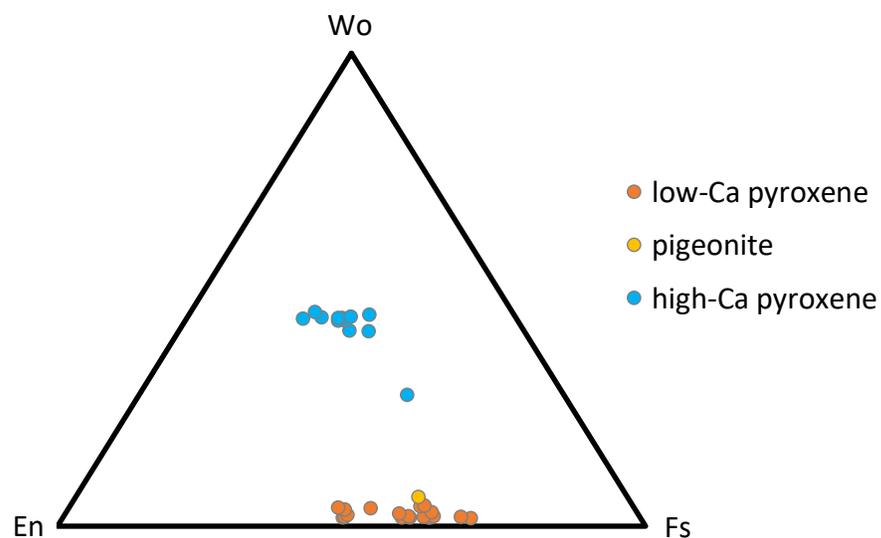


Fig. 5 Pyroxene compositional ternary showing poorly equilibrated basaltic and cumulate compositions.

Classification: HED achondrite (polymict eucrite breccia). Based on Fe/Mn ratios of pyroxenes, sample is an HED. Based on Mg# and Fs contents of pyroxenes, lithic clasts and mineral fragments are derived from basaltic cumulate eucrites.

Specimens: Fabien Kuntz holds the main mass. A polished thin section, an end cut and several fragments weighing a total of 31.67g.