CLASSIFICATION AND CHARACTERIZATION OF NEW POIKILITIC SHERGOTTITE, NORTHWEST AFRICA 14904.

E.J. Gackstatter[1],R.G. Mayne, J. Filiberto[2], S. Singletary[3], Mani [1]Monnig Meteorite Collection, Texas Christian University, 2950 W. Bowie St, Fort Worth, TX 76109 (e.gackstatter@tcu.edu), [2]Astromaterials Research and Exploration Science (ARES) Division, XI3, NASA Johnson Space Center, Houston, TX 77058, USA, [3]Department of Chemistry and Physics, University of North Carolina Pembrooke, 1 University Road, Pembroke, NC, 28362 =

Preliminary Work: The Monnig Meteorite Collection was approached to classify Northwest Africa (NWA) 14904, which consisted of an 800g single stony meteorite. External examination of the sample suggested that it was likely of Martian origin. It was requested that a record of the whole-rock sample was preserved before the sample was cut. 3D scans of NWA 14094 were completed using an Desktop 3D scanner. EinScan software was then used to create a composite model of the meteorite's surface. A second 3D model was produced using photogrammetry. Photographs of NWA 14904 taken using an automated turntable were loaded into the Agisoft Metashape program. 3D rendering was completed using the workflow outlined in Agisoft [1]. CT scans of both the main mass of NWA 14904 was performed at the University of Texas High-Resolution X-ray CT Facility at the University of Texas, Austin.

Classification: Two pieces of the main mass weighing 174.97 g and 4.67 g were donated to the Monnig Meteorite Collection for scientific analysis. A CT scan was also taken of the ~175 g end cut to yield a higher resolution dataset than could be achieved for the main mass. Thin sections were produced from the 4.67 g chip and the mineral chemistry of all major phases was analyzed using the JEOL JXA-8530F Field Emission Electron Probe Microanalyzer at Fayetteville State University, North Carolina. Elemental x-ray maps and BSE images were collected using the Hitachi TM4000 tabletop scanning electron microscope (SEM) at TCU.

Description of NWA 14904: NWA 14904 has a bimodal texture, typical of poikilitic shergottites [*e.g.* 2–4]. Poikilitic areas contain large pyroxene oikocrysts up to 4 mm in size enclosing chadacrysts of olivine which range from 0.35–0.7 mm. Non-poikilitic areas contain high and low-Ca pyroxene, maskelynite laths ($An_{48.33\text{-}54}Or_{0.07\text{-}2.92}$), and two size populations of anhedral olivines; larger olivines (~4-5 mm) are volumentrically more abundant than smaller (~0.5-1mm) anhedral olivine grains. The mafic silicates exhibit limited compositional zoning throughout the sample: $Fo_{65.15\text{-}69.12}$, low Ca-pyroxene $Fs_{19.59\text{-}25.24}Wo_{2.93\text{-}17.85}$, high Ca-pyroxene $Fs_{13.10\text{-}17}Wo_{30.01\text{-}38.20.}$ Accessory phases include merrillite, chromite, ilmenite, and sulfides. Significant evidence of shock is seen; pockets of dark brown shock melt, and shock veins are prevalent. The presence of brown olivine (Figure 1) suggests this meteorite experienced both high pressure and high peak and postshock temperatures [5].

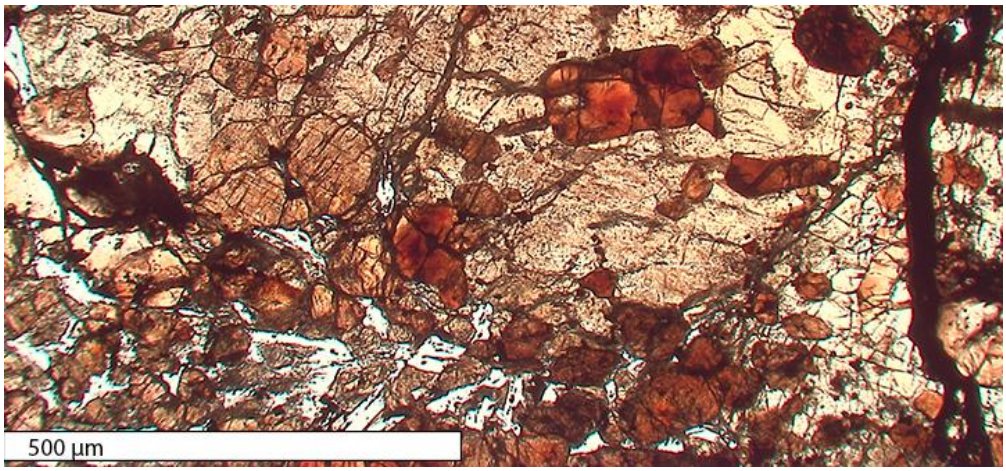

Figure 1: Thin section image of NWA 14904 in plane polarized light showing the presence of brown olivine.

References:[1] Agisoft (2022) 3D Model Reconstruction. [2] Combs L. M. et al. (2019). *Geochimica Et Cosmochimica Acta* 266:435-462, [3] Rahib R. . et al. (2019) *Geochimica Et Cosmochimica Acta* 266:463-496.[4] Kizovski et al. (2019) *Meteoritics & Planetary Science* 54:768-784 [5] Takenouchi A. et al. (2018) *Meteoritics and Planetary Science* 53:2259-2284.