DESCRIPTION OF NEWLY-IDENTIFIED CV3 CHONDRITES: SALIENT TEXTURAL AND MINERALOGICAL CHARACTERISTICS. A. J. V. Riches[1], Y. Liu[1], A. Zhang[2], and L. A. Taylor[1]. [1]Planet. Geosci. Inst., Univ. of Tennessee, Knoxville, TN 37996, USA, [2]Laboratory for Astrochemistry and Planetary Sciences, Purple Mountain Observatory, Nanjing 210008, P.R. China

Introduction: Carbonaceous chondrites, as primitive solar system materials, bear information on the condensation mechanisms and chronology of the early solar system. We recently acquired a number of carbonaceous chondrites, which were retrieved from unknown locations in Northwestern Africa. This abstract presents the preliminary results of two newly identified oxidized-CV3 chondrites (NWA-6101 and NWA-6102).

CV chondrites are a petrographically diverse meteorite group, containing primitive solar system material and relatively abundant refractory inclusions, which are crucial for constraining the chronology of the very earliest condensation and crystallization events of our solar system. Within this group the degree of thermal and aqueous alteration varies, and petrological type-3 CVs [1] are considered to be the least modified by these secondary processes.

Petrographic Characteristics: Chondrules in one CV3 chondrite (NWA-6102, ~640 g) are slightly deformed (elliptical) with apparent foliation (Fig. 1). Three other stones (A; ~50g; B; ~7g; C; ~11g) are grouped (NWA-6101) as they contain petrographically similar chondrule populations. Chondrules in these samples range in size from 0.5-2 mm. Barred-olivine (BO, Fig. 2), porphyritic-olivine (PO), and porphyritic-olivine-pyroxene (POP) chondrules are observed in all samples. Opaque chondrules rimmed by silicates were observed in NWA-6102 and NWA-6101(B) (Fig. 3).

Sulfides (troilite, pyrrhotite, and pyrite) and oxides (magnetite, hematite) are common opaque phases in all studied samples, and occur as opaque chondrules, form opaque assemblages [2] enclosed by PO and POP chondrules, and as dispersed grains in the fine-grained matrix. NWA-6102 contains an unusual S-rich chondrule (1 mm; Fig. 2) with fine-grained magnetite and hematite crystals (10-20 μm). Refractory inclusions in these samples include amoeboid olivine aggregates (AOA, up to 1 mm), calcium-aluminium-rich inclusions (CAIs; generally <1 mm), and occasional mineral and lithic fragments. Awaruite grains of 20-30 μm size are observed in trace amounts in all samples. The matrix/chondrule ratios range between the group of NWA-6101 and NWA-6102. NWA-6101(A) may contain a genomict breccia (Fig. 1).

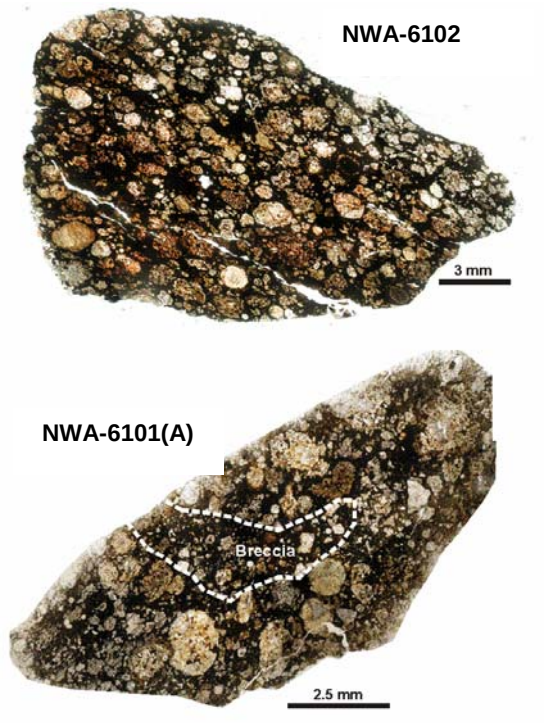

Figure 1: Transmitted light images of new CV3 chondrites.

BO-, PO-, and POP-Chondrules: Mineral chemistry is typical of CV3 chondrites. Olivine compositions in NWA-601 generally range from Fo_{68} to Fo_{98}, with low Fo-values found in BO chondrules and a relatively narrow range in NWA-6102 (Fo_{86-98}). Most pyroxenes in POP chondrules are enstatite. The Ni-content of sulfides in PO and POP chondrules varies; troilite generally contains <3.0 wt% Ni, and pentlandite <19 wt% Ni. Many opaque assemblages enclosed by PO and POP chondrules are characterized by increasing magnetite abundance toward the rim of the enclosing chondrule, which is indicative of increased oxidation. Opaque chondrules of NWA-6101(B and C) are composed of magnetite with minor residual troilite (up to 0.6 wt% Ni), and pyrite.

Refractory Inclusions: This collection of CV3 chondrites contains refractory inclusions ranging from AOA to CAIs. Compact CAIs are generally large (up to 1 mm), dominantly composed of melilite with minor spinel and perovskite, A large melilite crystal in a compact CAI of NWA-6101(A) displays irregular zoning (Ak_{32-42}), and contains rare schreibersite (Fig

4). Fluffy CAIs are also present and tend to be smaller in maximum dimension (0.1-0.5 mm), containing Mg-Al spinel, Al-rich high-calcium pyroxene, and melilite. AOAs in these CV3 chondrites are aggregates of forsterite with interstitial Al-rich high-calcium pyroxene.

Mineral and Lithic Clasts: Occasional lithic clasts were found in NWA-6101(B and C**).** These clasts typically contain a large single crystal of forsterite (Fig. 5). In this clast, forsterite contains two spinel inclusions with Mg# of 94 and 84, respectively, and an inclusion with a mixture of fine crystals. The range of spinel Fe-content may indicate alteration before entrapment by forsterite, a feature that will be explored in future.

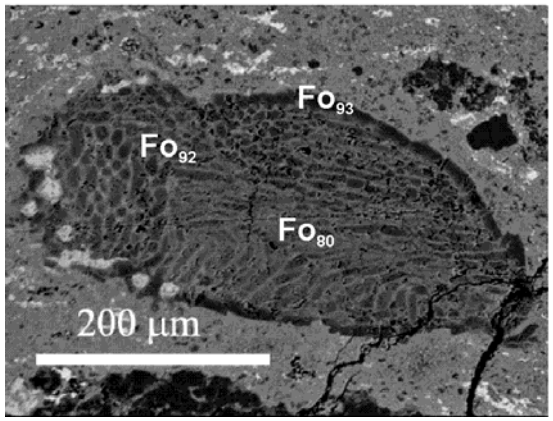

Figure 2: BSE image of a barred-olivine chondrule of NWA-6101(B). From rim to center, olivine displays an increasing Fe-content, and the elongate olivine bars showing different orientations.

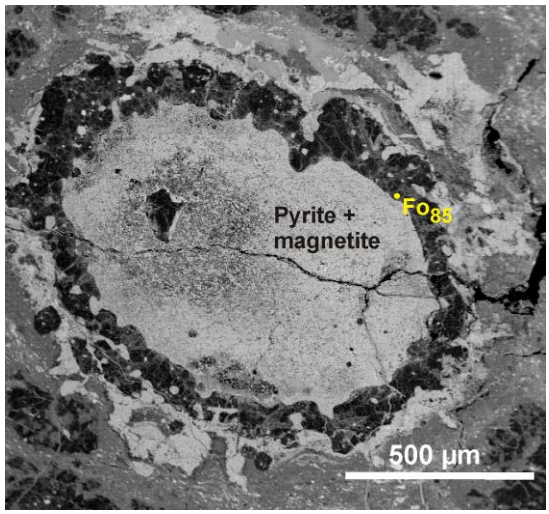

Figure 3: BSE-image of an unusual sulfur-rich chondrule of NWA-6102 embedded in a fine-grained matrix and rimmed by Mg-rich olivine (Fo_{85}).

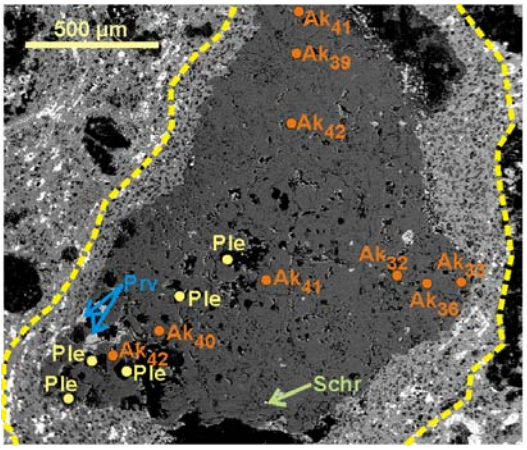

Figure 4: BSE-image of an unusual melilite clast within NWA-6101(A) embedded in a fine-grained matrix. Ak = åckermanite. Ple = pleonaste. Prv = perovskite. Schr = schreibersite. The dashed yellow line marks the extent of a fine-crystalline rim.

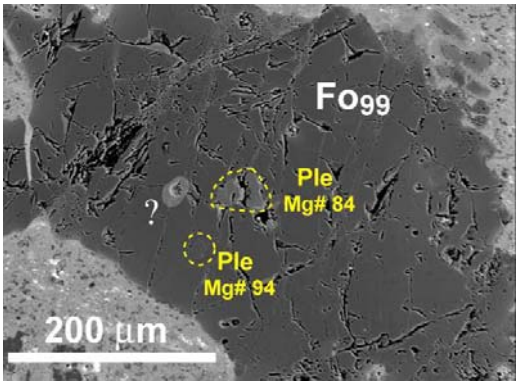

Figure 5: BSE image of a lithic fragment in NWA-6101(B) composed of forsterite with two spinel inclusions. Question mark (?) labels a Ca-Al inclusion that is composed of finely crystalline material.

References: [1] Guimon et al. (1995), *Meteoritics*, 30, 704-714 [2] Hsu, W. B. et al. (2006), *Earth &Planet. Sci. Let.**243, 107-114***