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**TRANSMISSION ELECTRON MICROSCOPY OF AN INTERPLANETARY DUST PARTICLE WITH LINKS TO CI CHONDRITES.** Lindsay. P. Keller[1], Kathie. L. Thomas[2], and David. S. McKay[1]. [1]SN14, NASA-Johnson Space Center, Houston, TX 77058, [2]Lockheed 2400 Nasa Rd. 1, Houston, TX 77058.

**Introduction** The majority of hydrated interplanetary dust particles (IDPs) have compositions that resemble CI and CM chondrites [1], however, their mineralogies are most similar to the fine-grained material in certain altered type-3 carbonaceous and ordinary chondrites [2,3]. During our transmission electron microscope (TEM) studies of hydrated IDPs, we discovered a unique particle whose mineralogy is very similar to that reported from CI chondrites.

**Experimental.** W7013F5 is a smooth particle (9 X 14 μm) with a chondritic bulk composition. We prepared microtomed thin sections (<100 nm thick) for study in the TEM. Our sample preparation techniques and TEM procedures (both imaging and analytical) are described elsewhere [2].

**Results.** The mineralogy of W7013F5 is dominated by phyllosilicates, carbonates, and sulfides. Trace phases include magnetite, kamacite, a Zn-bearing Fe sulfide, and a fibrous mineral with a 0.5 nm layer spacing.

The phyllosilicates exhibit a bimodal size distribution. Coarse-grained phyllosilicates up to 500 nm in length are common and occur in μm-sized clusters. Fine-grained phyllosilicates (typically <10 nm) are intergrown with carbonates and sulfides. High resolution (HRTEM) images show that the coarse phyllosilicates consist of intergrowths of 1- and 0.7-nm layers on the unit cell scale. EDS analyses combined with high-resolution images suggest that the coarse phyllosilicates are Fe-bearing saponite intergrown with Mg-Fe serpentine. The fine-grained phyllosilicates are poorly crystalline and show only 1-nm layer spacings in HRTEM images. Several curled flakes of a fine-grained layered mineral with a 0.5 nm periodicity (brucite?) occur with the coarse phyllosilicates but were too small to quantitatively analyse.

Mg-Fe carbonates are abundant in W7013F5 and occur in two morphologies, rhombohedral crystals up to 400 nm on edge, and rounded aggregates up to 200 nm in diameter. Molar Mg/Mg+Fe ratios in the carbonates range from 0.3 to 1. Ca and Mn occur as minor components. No correlation of carbonate morphology with composition was observed.

Rounded grains of pyrrhotite and pentlandite up to 200 nm in diameter are dispersed throughout the particle and are equally abundant. The maximum Ni content of the pentlandite is 26 wt.%. Rod-shaped grains (in cross-section) of pyrrhotite are also present.

**Discussion.** The distinctive unit cell scale intergrowth of saponite and serpentine has previously been reported only from the Orgueil CI chondrite [4]. Mg-Fe carbonates are common in CI chondrites and in other hydrated IDPs [5], but are not observed in other chondrite types. The compositions of the phyllosilicates, carbonates, and sulfides in W7013F5 overlap with those in CI chondrites but tend to be more Fe-rich. A major difference between W7013F5 and CI chondrites is the oxidation state recorded by the mineral assemblages. Fe-Ni sulfides and kamacite occur in W7013F5, whereas ferrihydrite (a Fe oxyhydroxide with adsorbed S) and magnetite are the major Fe bearing phases in CI chondrites.

**Conclusions.** W7013F5 is the first IDP whose mineralogy and chemistry approximates that of CI chondrites. The similarity in mineralogy and mineral chemistry suggests that W7013F5 was altered under conditions similar to those that existed on the CI parent bodies.

**References.** [1] Schramm, L. S. *et al.* (1990) *Meteoritics* 24, 99. [2] Thomas, K. L. *et al.* (1991) *XXII LPSC*, 1395. [3] Keller, L. P. and Buseck, P. R. (1990) *Geochim. Cosmochim. Acta*, 54, 2113. [4] Tomeoka K. and Buseck, P. R. (1988) *Geochim. Cosmochim. Acta*, 52, 1627. [5] Tomeoka, K. and Buseck, P. R. (1986) *Science*, 231, 1544.