CHEMICAL COMPOSITION OF ARTIFICIALLY HYDRATED ORDINARY CHONDRITES.

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Introduction: We have been disrupting meteorite samples as analogs for asteroid impacts. Using the NASA Ames Vetical Gun Range, we have found that ordinary chondrites have a different disruption pattern than carbonaceous chondrites [1]. We have disrupted more than a dozen different ordinary chodrites, but only four carbonaceous chondrites due to their rare nature. In an attempt to validate observations for the carbonaceous chondrites, we have been hydrating an ordinary chondrite to produce the mineralogy and texture of a carbonaceous chondrite [2, 3, 4]. While the samples have been characterized using FTIR in the past [5], herein we report on a chemical analysis of hydrated NWA 869 (L3-6).

Experimental: Hand samples of NWA 869 were crushed to less than 2 mm particle size, loaded into a teflon container with pH ~ 13 solution and placed in a Parr pressure bomb at 150°C for about three weeks [4]. Treated sample fragments were set into epoxy and polished for analysis using SEM-EDX.

Results: While some fragments show little evidence of alteration, other fragments are completely changed. Some minimally-altered fragments show classic chemistry for olivine, pyroxene, feldspar, troilite and other typical meteoritic minerals. Other samples have areas that are unaltered, but with regions of change around the edges of grains and within chondrules. Some fragments are heavily altered throughout. There is evidence in these of remnant condrules, but the chemistry is a wash of iron. In these fragments, there is complete alteration to a mix of hydrated iron oxides with pervasive carbonates and sulfates as well as the possibility of phyllosilicates and spinels.

Discussion: Not all of the material is altered, but this work should allow us to survey the fragments produced and pick and choose appropriate materials to use in experiments to make pseudo-carbonacaeous chondrites. In addition, it has led to changes in the hydration process, including more mixing of the material while it is reacting by inverting the container on a regular basis.

References: [1] Flynn G. J. et al. 2009. *Planetary and Space Science* 57:119-126. [2] Clayton A. N. et al. 2012. Abstract #2764. 43rd Lunar & Planetary Science Conference. [3] Clayton A. N. et al. 2013. Abstract #2730. 44th Lunar & Planetary Science Conference. [4] Clayton A. N. et al. 2014. Abstract #2799. 45th Lunar & Planetary Science Conference. [5] Strait M. M. et al. 2012. Abstract #5106. 75th Meteoritical Society Conference.