**INVESTIGATION OF THE HYDRATION OF ANHYDROUS CHONDRITE METEORITES.** M. A. Minnick[1], M. M. Strait[1], G. J. Flynn[2], and D. D. Durda[3]; [1]Dept. Of Chemistry, Alma College, Alma MI 48801. E-mail: 09maminn@alma.edu. [2]Dept. of Physics, State University of New York – Plattsburgh. [3]Southwest Research Institute.

**Introduction:** Understanding the fragmentation of an asteroid is crucial to studying the origin of interplanetary dust particles. In the main belt it has been predicted that nearly 50% if the material is of a hydrated nature. Hydrated meteorites are rare, and thus valuable, so the majority of impact studies have focused on anhydrous targets. Because hydrous meteorites are scarce and disruption experiments require relatively large samples, we are investigating a process to produce hydrous targets from the more common anhydrous meteorites.

Analysis of porosity and the size distribution of particles after fragmentation of meteorites has proven a successful methodology in modeling such disruptions [1]. Meteorites have been impacted using the NASA/Ames Vertical Gun [2]. In addition, the resulting fragments collected were sorted by size and then weighed. Holes created by the impact fragments on foil detectors were measured. The data are put into cumulative mass frequency diagrams to evaluate size magnitudes of the fragments.

**Discussion and Results:** Ohnishi and Tomeoka [3] attempted the hydration of thin sections of anhydrous chondrites with positive results. Using a similar procedure and set of conditions we have attempted to hydrate a bulk meteorite sample. A 17.28 g sample of North West Africa 869 was submerged in a pH 12.95 solution and heated for 5 months at 150 °C in a Teflon-lined acid digestion bomb. Once the sample was recovered from the vessel, it was cut in half and the exposed surface was analyzed using a Bruker Alpha-p ATR spectrometer.

The spectra of the sample showed a significant uniform OH stretch at 3500 $cm^{-1}$ consistently throughout the cross section of the meteorite. The spectra of the sample prepared above were compared to a fragment from a similar-sized sample of NWA 869 that had been processed using pH 7 water and heated for 3 months at 150 °C. Examination of the spectra from the two samples shows a deepening of the water peak at 3500 $cm^{-1}$ in the high pH sample (Figure 1).

**Conclusion:** This work shows that hydration of a bulk meteorite samples is possible. Further studies with run times of 3, 6, 12, and 18 months are in progress to evaluate the effect the length of time has on the extent of hydration. Larger vessels are also being procured to attempt the hydration with larger fragments. If the hydration is successful for samples of 30 grams or greater, they can then be disrupted as in the earlier fragmentation studies.

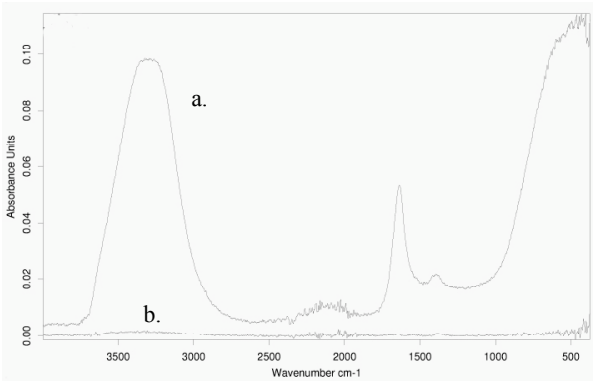


**Figure 1.** IR spectra for NWA 869. a) pH 12.95 for 5 months. b) pH 7 for 3 months.

**References:**

[1] Flynn G.J., et al. (2007) LPS XXIX, Abstract #1744. [2] Flynn G. J. and Klock W. (1998) LPS XXIX, Abstract #1112. [3] Ohnishi I. and Tomeoka K. (2007) Meteoritics and Planet. Sci., 42 49-61.