ELEMENTAL COMPOSITION AND CHEMICAL CLASSIFICATION OF SUTTER'S MILL CHONDRITES.

J. M. Friedrich[1,2], D. S. Ebel[2], and P. Jenniskens[3]. [1]Department of Chemistry, Fordham University, Bronx, NY 10458. E-mail: friedrich@fordham.edu [2]Department of Earth and Planetary Sciences, American Museum of Natural History, New York, NY 10024. [3]SETI Institute, 189 Bernardo Ave, Mountain View, CA 94043.

Introduction: On 22 April 2012, a fireball was detected over northern California, and meteorites were recovered from a strewn field near the Sutter's Mill historic site. As of one month later, nearly 50 individual stones totaling over 430 g in mass had been recovered. The stones were identified as chondrites and designated Sutter's Mill [1, also see 2]. Initial petrographic analyses suggest several carbonaceous chondrite lithologies are present in the recovered stones [3-5]. Herein, we present the initial bulk trace elemental analyses on a fragment of one stone – additional analyses will also be performed.

Samples and Methods: A 30 mg chip free of fusion crust was received for elemental analysis. The sample originated from the SM2 stone recovered in a parking lot by P. Jenniskens. It is unclear precisely which lithology is represented by our analyzed aliquot; however, the sample appeared homogeneous, consisting of a single lithology with no obvious inclusions present. The sample was split into two approximately equal pieces for elemental analysis to help examine the chemical homogeneity of the sample. We used the methods of [6] to quantify 45 trace elements by ICPMS.

Results and Conclusions: The two aliquots yielded nearly identical results, so on the 30 mg scale, the material was quite homogeneous. Overall, the composition of SM2 is consistent with a CM composition with respect to lithophile, siderophile, and moderately volatile abundances. The refractory lithophiles trend toward the high end of CM chondrites in the SM2 chip analyzed; however, the sample size is small. Our analyzed aliquot of fragment SM2 does not resemble a strictly CO, CV, CR, or Tagish Lake composition when considering overall elemental abundance trends [7, 8].

Chondrites with CM-like compositions (e.g. Belgica-7904, WIS 91600, or EET 96010) that have experienced post-hydration heating reaching up to 700-900°C are known [see 8 and references therein]. Based on the content of thermally labile or moderately volatile elements, our fragment of SM2 did not experience heating over ~500°C.

We will present additional elemental analysis results on the SM2 stone, as well as elemental analysis results on other stones and lithologies: we anticipate these analyses to further confirm a CM chondrite composition for Sutter's Mill and place a better limit on the degree of heating, if any, that the materials experienced.

References: [1] Jenniskens et al. 2012. *this volume*. [2] http://asima.seti.org/sm [3] Zolensky et al. 2012. *this volume*. [4] Ebel et al. 2012. *this volume*. [5] Nagashima et al. 2012. *this volume*. [6] Friedrich J. M. et al. 2003. *Geochimica et Cosmochimica Acta* 67:2467-2479. [7] Friedrich et al. 2002. *Meteoritics & Planetary Science* 37:677-686. [8] Moriarty G. M. et al. 2009. *Chemie der Erde* 69:161-168.