CHEMICAL CONSEQUENCES OF THE FORMATION OF OPAQUE ASSEMBLAGES ON THE MATRIX OF CR2 GRA 06100. N. M. Abreu and G. L. Stanek. Pennsylvania State University – DuBois Campus. E-mail: nma12@psu.edu.

Introduction: Several studies have contributed to our understanding of the record of alteration of CR chondrites [e.g., 1-5]. However, recent observations of CR2 GRA 06100 suggest that hydration of the CR parent body was a more diverse process than previously anticipated [6]. [6] observed that Fe,Ni metal in this meteorite was invariably and extensively altered to form complex assemblages containing Ni-bearing Fe-oxyhydrates, Fe-sulfides, partially oxidized Fe-sulfides, and in some cases relic metal. Here, we use EMPA and TEM to assess the effect that alteration of Fe,Ni metal grains has on the chemistry and mineralogy of the fine-grained materials in GRA 06100.

Results: Texturally, no distinct boundaries between fine-grained materials and chondrules are observed. Furthermore, typical CR2 matrix secondary assemblages [1,2], containing framboidal magnetite and calcite are not observed. However, individual magnetite grains were identified. Multiple regions of matrix were analyzed by EPMA for 13 elements (Na, Mg, Al, Si, P, S, K, Ca, Fe, and Ni) using a 10 μm-beam. Fine-grained regions in GRA 06100 are significantly more Fe-rich than the matrices of CR1 GRO 95577 [4] and moderately altered CR2 chondrites Renazzo [1,2]. Iron contents are comparable to weakly altered CR2 chondrites [5]. The average elemental abundance patterns are indistinguishable from other CR chondrite matrices. TEM observations reveal that the fine-grained materials are highly porous. In contrast with weakly altered CR2 chondrites where phyllosilicates are relatively rare, GRA 06100 matrix is dominated by phyllosilicates with basal spacings ranging from 14-17Å in association with rounded Fe-oxides, up to 100s of nm in diameter.

Discussion: [3] and [5] have argued that aqueous alteration of CR chondrites results in progressive decrease in the Fe content of the matrix, formation of rounded and framboidal magnetite, and the development of phyllosilicates. In this scenario, decrease in Fe content from the fine-grained materials is attributed to preferential incorporation of Fe into magnetite. Observations presented above indicate although GRA 06100 primary fine-grained materials were altered to form phyllosilicates, Fe-contents remained high. Influx of Fe from hydrated metal probably played a key role in the alteration of the fine-grained materials in GRA 06100, potentially maintaining elevated Fe contents in phyllosilicates as magnetite continued to form. Finally, TEM textures described above are reminiscent of those observed in hydrated and thermally altered chondrites described by [7]. [7] argued that the high porosity and large phyllosilicates basal spacings resulted from heating previously hydrated serpentine-saponite rich matrices. We suggest that GRA 06100 underwent a similar process.

References: [1] Weisberg M. K. et al. 1993. *Geochimica et Cosmochimica Acta:* 57, 1567-1586. [2] Zolensky M. E. et al. 1993. Geochim. Cosmochim. Acta 57, 3123-3148. [3] Kallemeyn G. W. et al. 1994. Geochim. Cosmochim. Acta 58, 2873-2888. [4] Weisberg M. K. & Huber H. (2007) *Meteoritics & Planetary Science,* 42: 1495-1503. [5] Abreu N. M. & Brearley A. J. 2008. Abstract # 2013. 39th Lunar & Planetary Science Conference. [6] Abreu N. M. & Stanek G. L. 2009. Abstract # 2393. 40th Lunar & Planetary Science Conference. [7] Akai J. 1990. 14th Symposium on Antarctic Meteorites. Proceedings of the NIPR Symposium. pp. 55.