**PRISTINE CHONDRITES DOM 08004 and DOM 08006: GROSSITE-RICH CO3.0s OR RELATIVES OF ACFER 094?** S. B. Simon[1] and L. Grossman[1,2], [1]Dept. of the Geophysical Sci., 5734 S. Ellis Ave., [2]The Enrico Fermi Institute, The Univ. of Chicago, Chicago, IL 60637. (sbs8@uchicago.edu)

**Introduction:** DOM 08006 (CO3) is one of the most primitive, least metamorphosed meteorites known [1]. This sample and a paired one, DOM 08004, thus offer an opportunity to study Ca-, Al-rich refractory inclusions (CAIs) that have been subjected to little or no alteration or metamorphism on a parent body. Here we characterize CAIs in the DOM samples and compare them with those in ALHA 77307 (CO3) and the ungrouped primitive carbonaceous chondrite Acfer 094 to see which samples are most alike and whether or not the two DOM samples should be paired, as some doubts have been raised [1].

**Methods:** We searched polished thin sections of the DOM samples and ALHA 77307 for CAIs by simultaneously collecting backscattered electron images and Al X-ray maps at 90× and 15 kV by SEM. Phases in each Al-rich object were identified by energy-dispersive analysis. Wavelength-dispersive analyses of selected inclusions were obtained by electron microprobe.

**Results:** A total of 218 CAIs were found in the DOM 08004 section, and 30 CAIs were found in 08006 (much smaller surface area). The CAIs are small (typically <100 μm across) and, like those in Acfer 094 [2], commonly have rims of melilite and/or aluminous diopside. Grossite-bearing inclusions are more common in DOM (12 and 7% of the populations in 08004 and 08006, resp.) and Acfer (5%) than in ALHA (0%) and CO3s in general [3]. Despite the pristinity of the DOM samples, with very limited metamorphism or hydration of matrices and a paucity of secondary alteration products in their CAIs, nominally FeO-free phases (mel, hib, grossite) in the latter commonly have FeO contents of ~0.4-1.2 wt%, quite elevated compared to those typical of CAI phases in CV, CM and low-grade CO chondrites [3, 4] and like those in Acfer 094 [2]. In 08004, Fe-Al oxide is associated with grossite in most occurrences. In one CAI, perovskite is partially altered to ulvöspinel.

*Notable inclusions in DOM 08004*. One inclusion is ~200 μm across and has a small, hibonite-rich core enclosed in a mantle of grossite that is 40-100 μm thick, and a pyroxene rim that is ~20 μm thick. The grossite contains fine pv blebs and veins of Fe-Al oxide. One inclusion contains Sc-rich pyroxene and a Sc-, REE-rich oxide plus pv and mel. One CAI has subhedral sp grains ~10 μm across with sharp contacts and even triple junctions between grains of strongly contrasting FeO contents (e.g., 3.6 *vs.* 9 wt%). A relict grossite-hib-mel-pv CAI occurs in an Al-rich chondrule (anorthite, Al-diop, and enstatite) fragment. Despite its enclosure in a large, FeO-poor host, the grossite in this CAI has stringers of Fe-Al-oxide, as seen in isolated grossite-bearing inclusions.

**Conclusions:** The CAI populations in the DOM samples are similar to each other and, based on grossite abundances, FeO enrichments and occurrences of rims, are more Acfer 094-like than CO3-like. An earlier history on an FeO-rich parent was favored over nebular equilibria or *in situ* reactions to account for FeO enrichments in CAIs in the otherwise pristine chondrite Acfer 094 [2], and a similar history may be indicated for the DOM CAIs.

**References:** [1] Alexander C. et al. (2014) *LPS XLV,* Abstr. #2667. [2] Simon S. and Grossman L. (2011) *Meteoritics & Planet. Sci., 46,* 1197-1216. [3] Russell S. et al. (1998) *GCA, 62,* 689-714. [4] Brearley A. and Jones R. (1998) *Revs. in Mineralogy, 36,* 3-1 – 3-398.