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SIZE DISTRIBUTION OF METAL GRAINS AND CHONDRULES IN ENSTATITE CHONDRITES. D. M. Schneider, D. G. Akridge, and D. W. G. Sears, Cosmochemistry Group, Department of Chemistry and Biochemistry, University of Arkansas, Fayetteville AR 72701, USA.

Introduction: Unmetamorphosed EL chondrites are little studied because they have only recently been discovered. Much discussion in the literature compares unmetamorphosed EH with metamorphosed EL chondrites. For instance, Easton [1] reported that EH-chondrite metal shows smaller grain sizes than EL metal due to metamorphic coarsening. Previously we reported mineral and textural studies of the chondrules in EL3 chondrites [2,3]. Here we report the metal grain sizes in EL3 chondrites and compare them to EH3 metal grain sizes. The size distribution of both chondrules and metal grains in these meteorites is one of their major

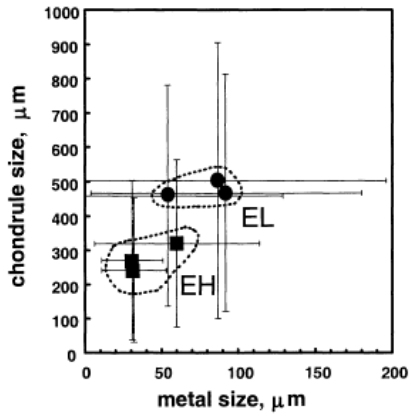

Fig. 1. Chondrule vs. metal grain sizes in enstatite chondrites. Error bars are ±1 σ.

features, and we suggest that this distribution is related to the fractionation of metal and silicates [4] by gravitational and aerodynamic sorting in a dynamic regolith [5].

Experimental/Results: Metal grain and chondrule sizes in three EH3 (ALH 84170, PCA 91085, and PCA 91238) and three EL3 (ALH 85119, MAC 88180, and PCA 91020) chondrite thin sections were measured using an optical microscope with a calibrated reticle. Only metal grains apparently not associated with sulfides, chondrules, or chondrule rims were measured. The long axis and its perpendicular were measured for each metal grain and each chondrule, and the average diameter was determined. Measurements include 199 chondrules and 660 metal grains from the EL3 sections, and 135 chondrules and 491 metal grains from the EH3 sections.

The chondrules and metal grains we measured have a range of sizes, with chondrule diameters of 45–1313 μm in EH and 85–2125 μm in EL, and metal diameters of 8–492 μm for EH and 2–1107 μm for EL. However, the size distribution for metal and chondrules in the EL chondrites is skewed to higher values, and the averages are different (Fig. 1).

Discussion: In every sample studied, the average chondrule size exceeded the average size of metal grains. Also, the average size of both the chondrules and the metal in EL chondrites is larger than that of the EH. In Easton's data [1], the EH samples represented a range of metamorphism (types 3–5), while the EL samples were all highly metamorphosed. The EL3 metal data presented here show the same tendency toward larger grain sizes as the highly metamorphosed EL6 chondrites in Easton's data. Thus the larger metal grain size in EL chondrites is a primary property, and is not due to metamorphic coarsening. The EH and EL chondrites show differences in chondrule and metal grain size distributions, with a tendency for both metal and chondrule size to increase from EH to EL. One proposed metal-silicate fractionation model that could explain this difference between the two types is the mobilization of material in a dynamic regolith, as proposed by Sears and Akridge [6].

References: [1] Easton (1983) *Meteoritics, 18,* 19. [2] Schneider et al. (1997) *LPS XXVIII,* 1257. [3] Schneider et al. (1998) *LPS XXVIII,* Abstract #1200. [4] Dodd (1976) *EPSL, 30,* 281. [5] Huang et al. (1996) *JGR, 101,* 29373. [6] Sears and Akridge (1998) *Meteoritics & Planet. Sci.,* in press.