LEW 88180, LEW 87119, AND ALH 85119: NEW EH6, EL7, AND EL4 ENSTATITE CHONDRITES. Y. Zhang, P. H. Benoit, and D. W. G. Sears, Cosmochemistry Group, Department of Chemistry and Biochemistry, University of Arkansas, Fayetteville AR 72701, USA.

The EH and EL chondrites formed in a uniquely reducing environment, containing low-Fe pyroxene, abundant metal, and a number of unusual sulfides and other minerals [1]. An important aspect of their history is that while the EL chondrites consist predominantly of metamorphosed meteorites, the EH consist primarily of little-metamorphosed meteorites [e.g., 2], and yet EL chondrites have lower equilibrium temperatures than EH chondrites [3,4]. To help understand this observation and its implication for the history of the classes, we have been searching for new enstatite chondrites, looking especially for meteorites of previously unknown chemical-petrologic class.

Using our normal INAA methods [5] and sample splits of 100–200 mg, the bulk composition of nine Antarctic enstatite chondrites and one fall were determined. The data were used to assign the meteorites to chemical classes, the Ni/Ir vs. Al/V plot (Fig. 1) being especially useful since it uses the refractory element difference between EH and EL chondrites and is insensitive to metal-silicate heterogeneity. The well-analyzed Qingzhen was included to check our method. ALH 84170, ALH 84206, and EET 87746, which Mason described as E3, E4, and E4, were all found to be EH chondrites [6]. Our data for the three paired EL3 chondrites were discussed earlier (MAC 88136, 88180, and 88184) [7,8]. LEW 88180, LEW 87119, and ALH 85119, which Mason described as type E6, E6, and E4 respectively [6], are EH, EL, and EL; thus LEW 88180 and ALH 85119 appear to be the first EH6 and EL4 chondrites.

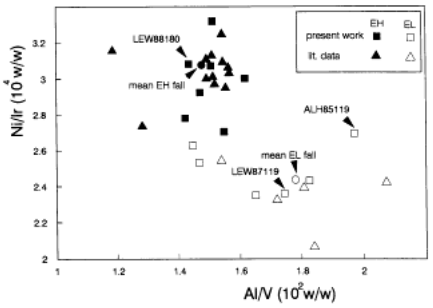

Fig. 1.

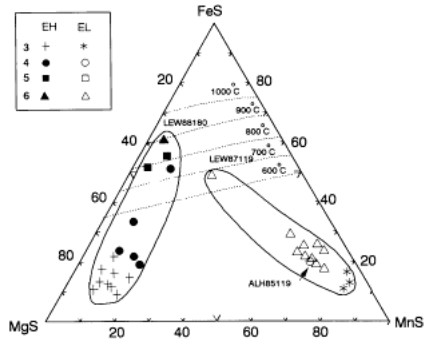

Fig. 2.

The compositions of kamacite, phosphide, and niningerite-alabandite (Fig. 2) for ALH 84170, ALH 84206, EET 87746, LEW 88180, and ALH 85119 are consistent with Mason's petrologic type assignments [6]. The mineral composition of LEW 88180 (2.7% Si and 9.4% Ni in the kamacite, 7.8% Ni in the phosphide, and 60% FeS in the niningerite) confirms our classification of this meteorite as EH6. ALH 85119 contains kamacite with 0.5% Si and 7% Ni, phosphide with 46% Ni, and alabandite with 22% FeS, confirming its classification as the first EL4 chondrite. The LEW 87119 meteorite has kamacite with 1.5% Si and 9.1% Ni, troilite with 2.9% Cr and 0.64% Ti, and alabandite with the highest FeS (49%) recorded for EL chondrites. Since the meteorite does not appear to be shocked or impact melted (it has medium-grained texture with the slightest indication of chondrules and normal metal and sulfide distribution) and the phase chemistry clearly indicates a higher equilibration temperature than the EL6 chondrites, for the time being we propose that LEW 87119 is an EL7 chondrite.

With the discovery in the last decade or so of a number of low-petrologic-type EH chondrites and the present discovery of EH6 and EL7 chondrites, the EH class and the EL class now appear to be comparable in their range of mineral compositions and thereby equilibration temperatures. The highest equilibration temperature for the EL chondrites is now ~700°C, which is close to that of EH6 chondrites (Fig. 2). Equilibration temperatures for the EL6 chondrites are similar to those of EH4 chondrites. It may be that EH and EL classes have more similar thermal histories than previously supposed and that it is purely the textures of the two classes that are widely different and in need of further research.

References: [1] Keil K. (1968) *JGR, 73,* 6945–6976. [2] Sears D. W. G. and Weeks K. S. (1984) *Nature, 308,* 257–259. [3] Skinner B. J. and Luce F. D. (1971) *Am. Mineral., 56,* 1269–1296. [4] Zhang Y. et al. (1992) *Meteoritics, 27,* 310–311. [5] Weeks K. S. and Sears D. W. G. (1985) *GCA, 49,* 1525–1536. [6] Mason (1986, 1987, 1989, 1990) In *Ant. Met. Newslett., 9(3), 10(2), 12(1,3),* and *13(2,3).* [7] Lin Y. T. et al. (1991) *LPS XXII,* 811–812. [8] Chang Y. et al. (1992) *LPS XXIII,* 217–218.

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