The role of S during melting can be modelled by varying the amount present within limits set by its cosmochemistry and the chemistry of iron meteorites. The first step was to consider the 1AB meteorites which contain chondritic inclusions and fractionation patterns suggestive of partial melting. Some unpublished data on the trace element contents of metal in the silicate inclusions proved useful. These grains cannot be derived from the metal that surrounds the inclusion because their trace element contents increase with decreasing grain size, a pattern similar to that observed in equilibrated ordinary chondrites (Rambaldi, 1977). Yet in bulk analyses all the siderophile elements are present in their solar proportions, similar to the metal which surrounds the silicate inclusions. There is one important difference in the composition, however: the concentrations in the metal from the inclusions is nearly twice that of the surrounding metal. The only way to increase the concentrations of all siderophiles is to decrease the Fe content by converting it to FeO or FeS. Since the FeO content of the silicates in 1AB meteorites is less than in H-group chondrites while the elemental concentrations are greater, this implies significantly more FeS in the 1AB parent body than in the chondrites. The Fe/FeS ratio must be close to, or perhaps to the FeS rich side of, the eutectic composition. This explains the observation that many 1AB meteorites contain all the siderophile elements in solar proportions.

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ION MICROPROBE STUDY OF RIM AND CORE PEROVSKITE IN AN ALLENDE INCLUSION

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The mechanism of rim formation on CAI is not fully understood but can be constrained by analysis of rim and core materials. Neutron activation analysis (Boynton and Wark, 1985) has shown that bulk rim material is more refractory than core material; in particular, Yb and Eu are depleted relative to neighboring REE. Ion microprobe analyses of individual perovskite grains in the core and rim, however, showed no similar depletions (Fahey *et al.*, 1985). We have used the ion microprobe to determine REE concentrations in a number of perovskite grains in the core and rim of the Allende group I type A coarse-grained inclusion TS12F1 (Grossman, 1975; Grossman and Ganapathy, 1976).

Results of the REE analyses of perovskite are shown in Figure 1. Rim perovskite is depleted in Yb and possibly Eu but is otherwise unfractionated relative to inner core perovskite. The absolute concentrations for all REE, except Yb, are remarkably alike. This seems to support the hypothesis that rims are refractory residues of core materials; however, the marked difference between rim and outer core perovskite complicates this picture.

Some interior perovskite grains show large LREE enrichments. The degree of LREE enrichment is correlated with position of the perovskite in the inclusion. Perovskite grains nearer the rim are most enriched. Ba, La, Ce and Pr concentrations were measured in interior melilite along a line perpendicular to the rim. The Ba and LREE concentrations were found to vary systematically as shown in Figure 2. Differences in REE concentrations among the perovskites and melilites can be attributed to partitioning between the two as the inclusion solidified.

Mg isotopic measurements were made on interior melilite and on an Al-rich area in the rim. Significantly, both had radiogenic ^{26}Mg excesses consistent with the canonical $[^{26}Al/^{27}Al]_i = 5 \times 10^{-5}$. The melilite was also found to be mass fractionated in favor of the heavy isotopes by 11 ± 2 permil/amu.

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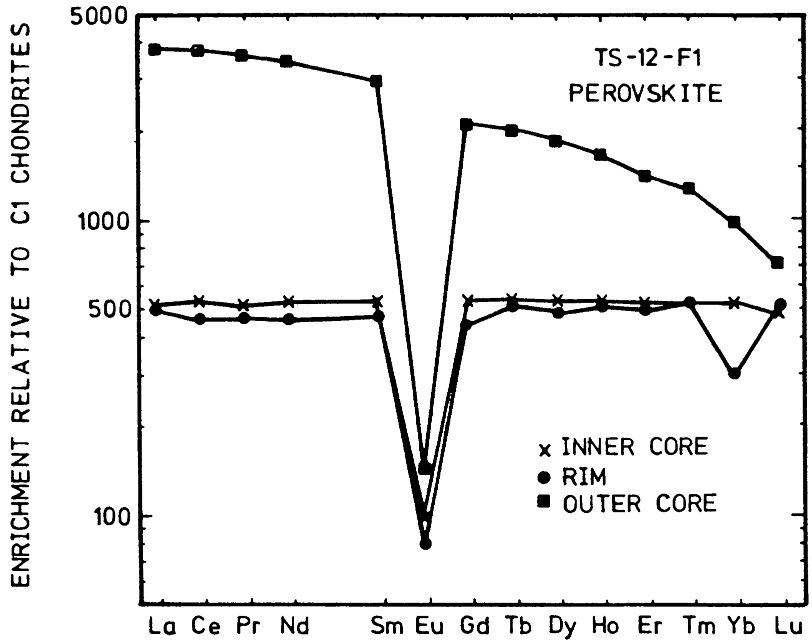

Fig. 1

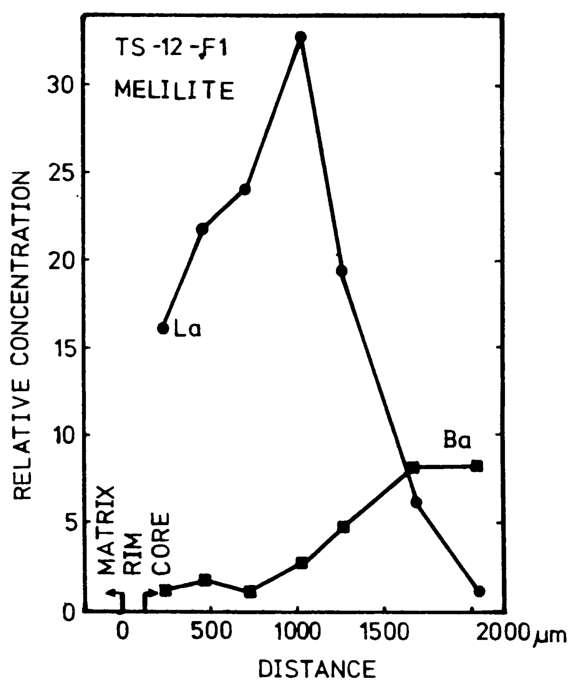

Fig. 2