Sears, D.W. and Axon, H.J. (1977) Condensation/accretion conditions of the major iron meteorite groups. *Meteoritics*, **12**, 362.

CONDENSATION/ACCRETION CONDITIONS OF THE MAJOR IRON METEORITE GROUPS

D.W. Sears and H.J. Axon, *Department of Metallurgy, Manchester University, U.K.*

The condensation behaviour of Ga, Ge, Ni and the minor elements C, P and S have been calculated and the results applied to determining the formation conditions of the iron meteorite groups IAB, IIAB, IIIAB, IVA and IVB. These groups contain 72 percent of all iron meteorites. It is concluded that considerable pressure differences existed in the regions where the IAB, IIAB, IIIAB, and IVA parent bodies condensed and accreted. However their Ga, Ge and Ni contents were fixed at essentially similar temperatures. Since Ga and Ge are fully condensed in IAB, only a lower limit for the ambient pressure can be defined. IIAB formed at the lower end of this range but at 50 ± 10 °K higher temperatures. IIIAB and IVA formed where the pressure was 1/20 and 10^{-4} of this, but over the same temperature range as IAB (600-670 $\pm^{60}_{40}$ °K). IVB is a high temperature condensate which could have formed at any pressure less than 10^{-3} atmospheres.

The carbon enrichment of IAB can be explained by this group forming at 10^{-4} atmospheres when the concentration of carbon as a solid solution in the metal is highest. Then the lower carbon abundance in IIAB and IIIAB and the absence of carbon in IVA and IVB may also have been determined during condensation and accretion. The presence of sulphides in all groups except possibly IVB is consistent with their formation below 695 °K when sulphur condenses as FeS. Phosphorus condenses too readily to be a useful guide to condensation and accretion conditions.