

GROUPING THE UNGROUPED ATAXITES

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Of 62 known ataxites, a majority of 40 are ungrouped or unclassified. The remainder are scattered among various iron meteorite chemical groups, except for group IVB, which contains only ataxites.

Examination of available analyses of ungrouped ataxites reveals that Babb's Mill (Troost's Iron), El Qoseir, ILD 83500, Illinois Gulch, Morradal, Nordheim, South Byron and Tucson are possible members of a chemical group. Log-log plots of Ni vs. Ge, Ni vs. Ga and Ni vs. Co are highly correlated with positive slopes; however, the Ni vs. Ir plot does not show a correlation. There are insufficient data for analysis of other trace element relationships.

The Ge, Ga and Co vs. Ni plots exhibit the same general trends as those seen in group IVB ataxites [1]; however, the contents of these elements are much greater than in group IVB and the apparent extent of fractionation is also greater. Ir-contents are lower and do not exhibit the negative slope in log Ni vs. log Ir seen in group IVB.

Processes for the formation of high-Ni iron meteorites were considered in relation to various groups of meteorites by McCoy et al. [2]. Babb's Mill (Troost's Iron), ILD 83500 and South Byron have been called the South Byron trio [3] and have been the object of special attention owing to their compositional similarity to the Milton pallasite [4]. Oxidation can account for depletion of refractory elements such as W, Cr and P which are readily oxidized, as well as enrichment in Ni by oxidation of Fe. However, in ILD 83500, Nordheim and Tucson for which data are available [3,4], W and Cr do not appear to be depleted. The South Byron trio, however, has been shown to be depleted in W, Mo, Fe, Cr and P. Their formation was attributed to initial high-temperature condensation to produce high Ni-contents, followed by oxidation of refractory elements, which was the dominant process [5]. Whether this scenario is applicable to the other ataxites considered here remains to be seen.

The eight ataxites discussed above may constitute a group or grouplet within a field of ungrouped (formerly "anomalous") iron meteorite, as discussed by Scott [6]. However, as he lamented then, a lack of analytical precludes a definite answer.

References: [1] Rasmussen K.L. et al. 1984. *Geochimica et Cosmochimica Acta* 48:805-813. [2] McCoy T.J. et al. 2008. *Meteoritics & Planetary Science* 32:A74. [3] Wasson J.T. et al. 1989. *Geochimica et Cosmochimica Acta* 53:735-744. [4] Malvin D.J. et al. 1984. *Geochimica et Cosmochimica Acta* 48:785-804. [5] Reynolds V.S. et al. 2006. *Meteoritics & Planetary Science* 41:A147. [6] Scott E.R.D. 1979. *Mineralogical Magazine* 43:415-421.