Cr AND O ISOTOPIC LINKS BETWEEN HED, IIIAB IRONS AND PMG

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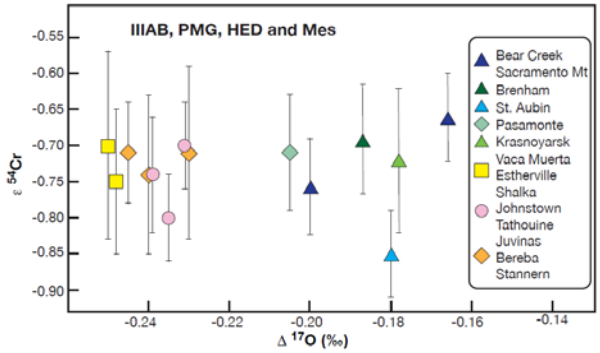
HED meteorites are commonly believed to originate on the large asteroid Vesta. However, the only clear link to Vesta is the qualitative resemblance between the basaltic reflection spectra of Vesta and the howardites and eucrites.

Wasson [1] noted that isotopic data imply a genetic relationship between the HED, PMG and IIIAB irons and argued that it is more plausible that the HEDs originated on the asteroid parental to the IIIAB irons, the largest group of iron meteorites. He included a version of the following diagram in which chromite (and metal) ε^{54}Cr data by Trinquier et al. [2] were plotted against Δ^{17}O data by Greenwood et al. [3,4] and Clayton et al. [5]. Because Trinquier analyzed only one IIIAB iron (St. Aubin) and one pallasite (Krasnojarsk) we studied additional chromite samples. On the following diagram we show data for two additional IIIABs and one PMG. To reduce confusion arising from systematic differences between labs we added 0.04‰ to the Clayton IIIAB values for Bear Creek and Sacramento Mountains.



The new data are consistent with previous conclusions. HED, Mes, PMG and IIIAB are unresolvable in terms of ε^{54}Cr. As noted [1], the differences in O isotopes are in the direction expected if the HED magma was formed by rapid heating of an unequilibrated chondrite by an impact. The interpretation that the HEDs may have originated on the IIIAB parent asteroid is reasonable. We argue that isotopic evidence trumps (qualitative) spectral evidence.

References: [1] Wasson J. (2013) *EPSL* **381**, 138. [2] Trinquier A. et al. (2007) Ap. J. **655**, 916. [3] Greenwood R. et al. (2005) *Nature* **435**, 916. [4] Greenwood R. et al. (2006) *Science* **313**, 1763. [5] Clayton R. et al. (1996) GCA **60**, 1999.#