ANOMALOUS OXYGEN ISOTOPIC COMPOSITIONS OF UNEQUILIBRATED BUT SUPPOSEDLY ORDINARY CHONDRITES, INCLUDING UNGROUPED SILICA-BEARING CHONDRITE JIDDAT AL HARASIS 846.

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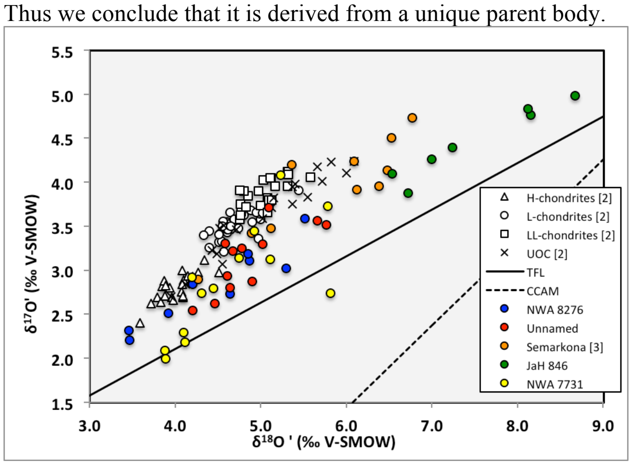
For many years one of the strong tenets in meteoritics has been the concept of three distinct ordinary chondrite parent bodies corresponding to the well-known H, L and LL classes. Pioneering studies of mineral compositions [1] and oxygen isotopes [2] have been widely accepted as providing discriminant measures to define these separate classes. Although this approach appears to work well for equilibrated chondritic specimens (few of which are now analyzed routinely for oxygen isotopes), it has become increasingly apparent that highly unequilibrated ordinary chondrites present a great challenge in attempts to place them in proper context with respect to their parent body.

We had expected that multiple oxygen isotope analyses of small subsamples of highly unequilibrated specimens (of Types <3.5) would yield mean compositions which would associate them unambiguously with the three well-known ordinary chondrite groups. This exercise is equivalent to a thought experiment whereby the unequilibrated specimens are diffusively homogenized in major elements (including oxygen) by thermal metamorphism to become Type 4, 5, 6 or even 7 chondrites. Instead the results for some (but not all) such specimens do ***not*** yield means close to those expected, and replicate oxygen isotope compositions for some individual subsamples plot near or below the TFL.

Jiddat al Harasis 846: This specimen has many features suggesting it is an unequilibrated ordinary chondrite (perhaps L3.5 or LL3.5). Chondrules (diameter 0.2-2.2 mm) are well-formed and olivine compositions are $Fa_{0.6\text{-}38.1}$ (with 0.04-0.22 wt.% Cr_2O_3 in ferroan examples). However, it is unusual in having abundant silica polymorph (probably cristobalite) with orthopyroxene in chondrules, and even more so since oxygen isotopic compositions of 7 acid-washed subsamples plot well beyond (in $\delta^{18}O$) the known ranges for any ordinary chondrites, and far below (in $\delta^{17}O$) the established fields for LL and L chondrites. Thus we conclude that it is derived from a unique parent body.



References: [1] Van Schmus W. and Wood J. (1967) *Geochim. Cosmochim. Acta* **31**, 747-765 [2] Clayton R. et al. (1991) *Geochim. Cosmochim. Acta* **55**, 2317-2337.