MASS FRACTIONATION OF Fe AND Ni ISOTOPES IN METAL IN HAMMADAH AL HAMRAH 237.

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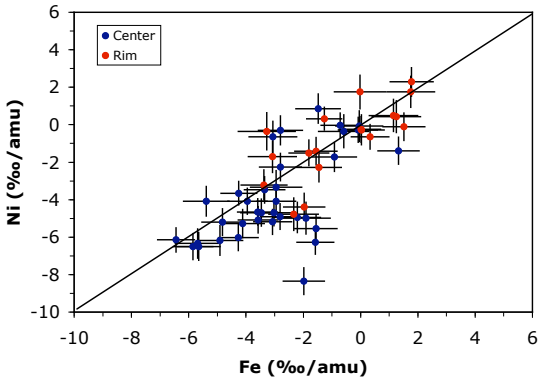
Introduction: A number of CH and some "CB" chondrites contain zoned Fe-Ni metal grains, with Ni- and refractory PGE-rich cores [1-4]. They have been explained by near-equilibrium to disequilibrium condensation from solar to lithophile-enriched gas. We analyzed Hammadah al Hamra 237 in search of additional constraints for the conditions of formation of its zoned metal.

Results: The Ni-rich cores are easily identified in BSE. This metal has up to 12% Ni and has experienced minor exsolution, whereas rims and unzoned metal have down to 6% Ni. Iron and Ni isotope analyses were performed using the Carnegie Cameca IMS 6f ion probe at a mass resolution of ~8000. The standards were Nelson County (IIIF) and NBS126C, a high Ni steel.



Iron and Ni show large, correlated mass fractionations, with a total range of ~8‰/amu. On average, the cores have lighter isotopic compositions than the rims. Under Rayleigh conditions, Fe and Ni condensation produces roughly a -8 to -9‰/amu fractionation in condensates relative to the gas. This meteorite also has a negative bulk δ^{65}Cu [5]. The Fe, Ni and Cu isotopes all suggest that the metal in HH 237 formed by rapid, disequilibrium condensation.

References: [1] Weisberg M. K. and Prinz M. 1999. *Proc. NIPR Symp. Antarc. Meteor.* 30:189–190. [2] Meibom A. et al. 1999. *Journal of Geophysical Research* 104:22053–22059. [3] Campbell A. J. et al. 2001. *Geochim. Cosmochim. Acta* 65:163–180. [4] Petaev M. I. et al. 2003. *Geochimica et Cosmochimica Acta* 67:1737–1751. [5] Russell, S. S et al. 2003. *Meteoritics & Planetary Science* 38:A124.