CHEMICAL FRACTIONATION AND ALTERATION TRENDS BETWEEN FIVE NAKHLITES. J. C. Bridges, T. E. Jeffries and M. M. Grady, Dept. of Mineralogy, Natural History Museum, London SW7 5BD, UK, j.bridges@nhm.ac.uk.

Introduction: We combine new petrographic and geochemical (solution ICPMS) data on 5 nakhlites in order to show igneous fractionation and alteration trends between the samples.

Trace Elements: Nakhla (BM1913, 26) and Y00593 have nearly identical relative abundances of the REE e.g. La/Lu = 3.5, 4.0 but Nakhla has 4.5 – 1.3 x CI REE with Y00593 having higher abundances 6.9 – 1.7 x CI. The abundances are consistent with Rayleigh fractionation of a LREE-enriched melt - composition from [1] - and crystallisation of an ol-cpx adcumulate from it at F (fraction of melt remaining) = 0.6. Addition of ~5% trapped melt to this produces REE abundances similar to those of Y00593. Nakhla has trapped slightly lower proportions of melt, or its melt experienced a lower degree of crystal fractionation.

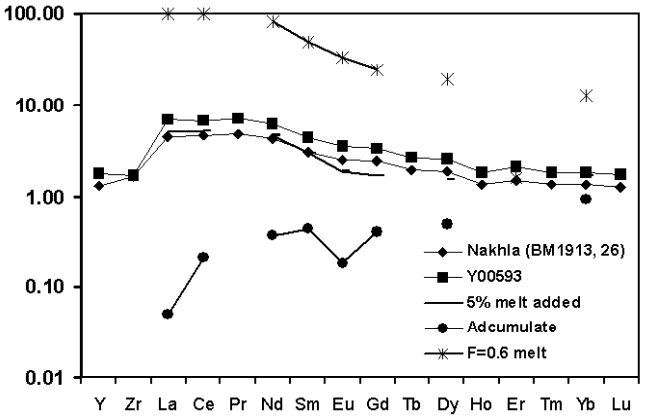

Fig. 1: CI normalised trace elements in Y00593 – see also [2] - and Nakhla. These can be modelled as addition of trapped melt to an ol-cpx adcumulate derived from a LREE-enriched parental melt.

Siderite-bearing veins in NWA998 and Y00593: ASEM analyses of veins within the olivine of these 2 nakhlites show that they contain a mixture of Mn-bearing siderite and Fe-rich clay. The chemical and textural similarities between these veins and those of the other nakhlites suggest they have a related origin on Mars [3,4]. The volume of these veins is smaller than those of the 3 other nakhlites we have studied [3]. Using the model of [3] the Fe-Mn dominated composition of the siderite/clay mixtures suggests that they formed at a similar, late stage of brine evaporation as the veins in Nakhla.

References: [1] Wadhwa M. and Crozaz G. (2003) *LPS XXXIV,* #2075. [2] Nakamura N. et al. (2002) *Antarct. Meteorites XXVII*, 112. [3] Bridges J. C. and Grady M. M. (2000) *EPSL, 176,* 267–279. [4] Gooding J. L. et al. (1991) *Meteoritics, 26,* 135-143.