

TRACE ELEMENT ANALYSES OF VIGARANO CHONDRULES. E. Jacquet^{1,2}, M. Gounelle², O. Alard³. ¹ENS Paris, 45 rue d'Ulm, 75005 Paris, France. ²LMCM, CNRS & MNHN, CP52, 57 rue Cuvier, 75005 Paris, France. ³Geosciences Montpellier, UMR5243, Université de Montpellier II, Montpellier, France. E-mail: emmanuel.jacquet@ens.fr.

Introduction: The trace element geochemistry of chondrule precursors might hold clues to their genesis (see e.g. [1]). Most noteworthy among them are olivine-rich aggregates in CV chondrites described by [2], who interpreted their 120° triple junction-rich (granoblastic) textures as diagnostic of an origin in early differentiated planetesimals. Subsequent melting and reaction with nebular gas of these precursors might have lead to porphyritic textures of chondrules, as was checked experimentally by [3]. We report here trace element analyses for olivine-rich type I chondrules, in a section of Vigarano (CV_{red}3.3).

Methods: Chondrules were documented using scanning electron microscopy and electron microprobe. Trace elements ICPMS analyses were performed at Montpellier II. Spot size was 20 to 50 µm for silicates.

Results:

Petrography. Triple junctions have been found in virtually all olivine-rich chondrules. Some textures suggest close packing rather than a mantle origin. Olivine Fo content mostly exceeds 95 mol %, with Fo = 99 mol % being commonplace. Pyroxene outer layers are similarly Mg-rich. Junction-disrupting melt may occur in the periphery or at the center. Some objects, entirely surrounded by pyroxene, do not have rounded outlines; however, one chondrule, containing an outer wall full of triple junctions, does, contradicting a relict nature of the latter.

Geochemistry: Rare Earth Elements (REEs) contents in olivine are comprised between 0.002 and 0.4 x CI. Their normalised patterns are variable; for instance (La/Yb)_N varies from 0.049 up to 1.690. Within a chondrule the variation between olivine grains spans the full range of LREE/HREE fractionation observed between chondrules. Eu behaviour relative to the other MREE is also extremely variable from chondrule to chondrule. Indeed, olivine in several chondrules shows pronounced negative Eu anomalies while others do not. So far there is no obvious relationship with Eu behaviour in the coexisting phases. Most olivines show a Sr positive anomaly. Preliminary observations on 5 chondrules suggest that K_d(ol-px) is extremely variable for the HREEs, but show a limited range of variation (within errors) for the most incompatible trace elements such as LREEs, Sr, Nb and Th.

References: [1] Ruzicka A., Floss C., Hutson M. 2008, *Geochimica et Cosmochimica Acta*, 72, 5530-5557. [2] Libourel G., Krot A. N. 2007, *Earth and Planetary Science Letters* 254, 1-8. [3] Whattam S. A., Hewins R. H. 2008 *Lunar and Planetary Science XXXIX*, 1748.