NON-PORPHYRITIC CHONDRULES IN ENSTATITE CHONDRITES. M. E. Varela[1], P. Sylvester[2], F. Brandstätter[3] and A. Engler[4] . [1]ICATE-CONICET, Av. España 1512 sur, San Juan, Argentina, evarela@icate-conicet.gob.ar; [2]Department of Earth Sciences, Memorial University of Newfoundland, St. John's NF A1B 3X5, Canada; [3]Mineralogisch-Petrographische Abteilung, Naturhistorisches Museum, Burgring 7, 1010 Wien, Austria; [4]Institute of Earth Science, University of Graz, 8010 Graz, Austria.

Introduction: Enstatite chondrites (ECs) are very scarce among the chondritic meteorites. The chemical composition of their silicates, sulphides and metals reflect formation under highly reducing conditions [1-2]. With the aim to gain information about the physico-chemical conditions under which ECs were formed we report about a petrographic and chemical study of individual non-porphyritic chondrules and chondrules fragments.

Results and Discussion: The investigated samples are PTS Sahara 97158 (EH3) and Indarch (EH4), from the NHM Vienna (inventory numbers: N3264 and N2137, respectively). The trace element analyzes were performed by Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) following the procedure of [3].

All studied objects have mainly granular, fibrous and platy (fine and coarse) textures and range in size from 250 to 800 µm in apparent diameter, with only one object reaching 2.6 mm. Besides troilite, oldhamite is present as an ubiquitous phase in all chondrules. Other exotic sulphides (niningerite, heidite) are less abundant. The bulk major and minor element compositions of individual chondrules in Sahara 97158 and Indarch (see [4] for detail conditions of analyses) show that the sums of the volatile components (K_2O + Na_2O) vs Al_2O_3 scatter roughly around the CI line. This weak correlation could signal a re-equilibration process with the chondritic reservoir. All objects have variable abundances of refractory, moderately volatile and volatile lithophile elements that are within the range shown by the non-porphyritic chondrules in UOC [4]. The abundances of Yb and Ce are well-correlated spreading around the primordial ratio. The fact that elements with different geochemical behavior (Yb-Ce) are not fractionated indicates the predominance of a cosmochemical process (condensation) during formation of these chondrules. A negative Nb anomaly seems to be a characteristic feature for many chondrules which correlates, in the Indarch objects, with a strong negative V anomaly. Additionally, in several objects from Sahara 97158 a negative Eu anomaly occurs. These negative anomalies may signal removal of exotic phases (carbide, nitride or sulfide?) during formation of the EH3 and EH4 chondrites. A particular feature is observed in the chondrule SA 10, in which the olivine-rich core is strongly depleted in Nb, as compared to its pyroxene-rich rim (slight Nb depletion), providing evidences that removal of elements could have been a fast process occurring during formation of a single object.

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