

### LA-ICP-MS ANALYSIS OF METALLIC FE-NI IN EH3 CHONDRITES — FRACTIONATION OF SIDEROPHILES IN THE REDUCING NEBULA

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**Introduction:** Enstatite chondrites formed under extremely reducing nebular conditions. Recent bulk analysis of enstatite chondrites and other groups revealed different high siderophile element (HSE) patterns among them [1]. Micro-distributions of HSE and other trace elements in metallic Fe-Ni from many groups of chondrites except for enstatite chondrites were measured with LA-ICP-MS [2-4]. In this work, we conducted in situ analysis of HSE (Re, Os, Ir, Ru, Pt, Rh, Pd and Au) and other trace elements (W, Mo, Ni, Co, P, As, Cu, Ga, Ge) in metallic Fe-Ni from Qingzhen (EH3) and Sahara 97159 (EH3) with LA-ICP-MS. The new data display fractionation of HSE during condensation of metal under highly reducing nebular conditions.

**Results:** 12-points analyses were carried out on 9 of Qingzhen kamacites, and their HSE patterns can be divided into 3 types: (A) 5 analyses show a flat pattern except for negative anomaly of Pd. Three of them are also Mo-depleted; (B) 5 analyses are gradually depleted from Au to Os, except for a large variation in Re; (C) 2 analyses are similar to pattern B but more steep and with negative anomaly of Ir. It is noted that a metal grain varies from pattern B at the core to pattern C at the rim.

Significant differences in the HSE patterns were found in Sahara metals in comparison with Qingzhen. They show no Ir-, Pd-negative anomalies, and can also be divided into 3 types: (A) 7 analyses show a nearly flat pattern except for slight enhancement from Pd to Au. They are Mo-depleted; (B) 3 analyses are similar with pattern B of Qingzhen, except for 2 with negative anomaly of Pt; (C) 3 analyses show enrichment increasing from Rh to both Re and Au, except for one with negative anomaly of Pd. Pattern C seems complement to pattern B.

**Discussion and conclusions:** Both Qingzhen and Sahara 97159 are EH3 chondrites, however, their HSE patterns of metallic Fe-Ni are significantly different. In general, more grains from Qingzhen are HSE-depleted (pattern B) with negative anomalies of Pd or Ir. It is possible that Qingzhen metals condensed from a more HSE-depleted nebula in comparison with Sahara 97159. The higher HSE contents of Sahara metals are also consistent with its unusually abundant CAIs [5]. Absence of W-depletion in most metals from both meteorites is consistent with the highly reduced conditions of EH chondrites.

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**References:** [1] Fischer-Goedde M., et al. 2010. *Geochimica et Cosmochimica Acta* 74: 356-379. [2] Campbell A. J., et al. 2001. *Geochimica et Cosmochimica Acta* 65: 163-180. [3] Campbell A. J., et al. 2002. *Geochimica et Cosmochimica Acta* 66: 647-660. [4] Campbell A., et al. 2005. In *Chondrites and the Protoplanetary Disk* (ed. (eds. Krot A. N., et al.). pp. 407-431. *Astronomical Society of the Pacific Conference Series*. [5] Lin Y., et al. 2003. *Geochimica et Cosmochimica Acta* 67: 4935-4948.