# SIDEROPHILE ELEMENTS IN METAL FROM THE ISHEYEVO CH/CB CHONDRITE.

N. Chaumard[1], M. Humayun[2], B. Zanda[1], and R. H. Hewins[1,3]. [1]IMPMC/MNHN/UPMC FR75005 E-mail: nchaumard@mnhn.fr. [2]NHMFL, Florida State University, Tallahassee, FL 32310, USA. [3]Rutgers University, Piscataway, NJ 08854, USA.

**Introduction:** The origin of the metal-rich CH and CB chondrites is still debated. Both nebular [e.g. 1–4] and planetary processes [e.g. 5–9] have been proposed to explain the mineralogy and chemistry of their components. The Isheyevo meteorite displays numerous similarities with CB and CH chondrites [e.g. 10], as well as prominent metal-silicate layering [11], and thus appears to be critical for our understanding of the origin and formation of these metal-rich chondrites.

**Methods.** LA-ICP-MS analyses of Isheyevo metal were performed at FSU using a New Wave UP193 FX excimer laser ablation system coupled to a Thermo Element XR ICP-MS. We used a 25 µm (5 s. dwell time) and 50 µm (10 s. dwell time) spot size, 50 Hz repetition rate, and a power output of 1.86 $GW.cm^{-2}$.

**Results and discussion:** Most of the metal in Isheyevo has Ni<10 wt% with Co/Ni ratios ranging from 0.8 to 1.4×CI, but a minority of grains are Ni-rich (11–64 wt%). We observed no evident relation between the layering of Isheyevo and the concentrations of siderophile elements in metal. In common with other CH/CB metal, the moderately volatile siderophile elements Cu, Ga, Ge, and Sn are depleted in these metal grains relative to CI abundances, by up to 4 orders of magnitude. Refractory siderophile elements, with the exception of W and Mo, are usually present in nearly chondritic relative abundances. Au is correlated with As, and other volatile elements, but does not correlate with Ir, Pd, or Ni. Further, compatible Ir correlates with incompatible Ni and Pd, as observed in CB metal [6,7], which is evidence against an igneous origin of Isheyevo metal. Most metal grains analyzed here are characterized by strong depletions in W abundances by nearly two orders of magnitude roughly correlated with Mo excesses and with Au abundances, implying a volatile behavior of W and Mo. In addition, Pd/Fe is correlated with Ni/Fe indicative of a more refractory behavior of Pd relative to Fe, as observed in CB metal [6]. The W-Au correlation and the presence of both excesses and depletions of W relative to Ir in the metal strongly support a formation from both a volatilization residue and a metal condensed from a vapor plume which had superchondritic W/Ir ratio in the gas.

**Conclusion:** A volatility-controlled signature is clearly observed in the compositions of most of the metal grains. The large W (and Mo) anomalies reflect condensation of the grains from a vapor plume formed under relatively oxidizing conditions [e.g. 9,12]. Our results are consistent with the formation of metal by evaporation and recondensation from a gas produced by a large impact involving a metal-rich body and a silicate body, as proposed by [5,6, and 9] for CB chondrites.

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