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Moderately volatile elements in CB and CH chondrites

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The carbonaceous chondritic types CB and CH are commonly grouped together as they exhibit similar mineral and chemical properties [1]. They both have high metal contents, reaching up to 70% in volume for CB [2,3] and 30% in volume in the case of CH chondrites [4]. An important feature of CH and subtype b of CB chondrites is the existence of chemically and isotopically zoned metal grains, which has led to two possible scenarios for their formation: either as the direct result of condensation from the solar nebula [5] or through condensation from an impact-induced vapor plume [6]. Recent elemental and isotopic studies favor the latter [7]. The stable isotope variations of moderately volatile elements (MVE) have proven to be useful tools to investigate condensation and evaporation processes. In this study, we investigate various CB and CH samples for their trace elements compositions as well as the isotopic signatures of a set of MVE, including Zn, Ga, Cd, Cu as well as the more refractory Fe. We have selected three CH, four CB including Bencubbin and the newly classified Arguin 001, as well as two separate pieces of the CB/CH Isheyevo. All samples were used for bulk rock elemental and isotope ratio measurements, while separated metal and silicate fractions of Bencubbin and Arguin 001 were also measured. Trace element data was collected using an Agilent 7700 ICP-MS instrument, while the isotope ratios were measured using a Nu II HR-MC-ICP-MS in combination with an Aridus 2 desolvating nebulizer at ULB. Our results are used to refine existing models on the condensation origin of (metal in) CB and CH chondrites.

[1] Weisberg et al. (1995), *Antarct. Meteor. Res*. 8, 11-32. [2] Weisberg et al. (2001), *Meteorit. Planet. Sci.* 36, 401–418. [3] Rubin et al. (2003), *Geochim. Cosmochim. Acta.* 67, 3283–3298. [4] Krot et al. (2002), *Meteorit. Planet. Sci.* 37, 1451–1490. [5] Petaev et al. (2001), *Meteorit. Planet. Sci.* 36, 93-106. [6] Fedkin et al. (2015), *Geochim. Cosmochim. Acta.* 164, 236-261. [7] Weyrauch et al. (2019), *Geochim. Cosmochim. Acta.* 246, 123–137.