SULFUR ISOTOPES OF CARBONACEOUS CHONDRITES AND VOLATILE-RICH CLASTS

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Volatile-rich clasts, a lithology inside brecciated meteorites consist if two types; (i) CI-like type (high amounts of phyllosilicates, magnetite and sulfides) (ii) CM-like type (phyllosilcates, TCI and often containing chondrules and anhydrous fragments) [1]. Raman thermometry of the carbon in the matrix suggests similar thermal histories for both clasts and CI and CM chondrites [2]. Based on these data one would suggest that both volatile-rich clasts and their corresponding chondrites are made of the same material. The S isotopic composition of sulfides, however, tell a completely different story.

Pyrrhotite and pentlandite in 49 different clasts have been analysed for their sulfur isotope composition (d33S and d34S). The sulfides in the volatile-rich clasts are compared to the sulfides in 8 carbonceous chondrites (CI, CM, $C2_{ung}$). Sulfur isotope compositions were obtained *in situ* using a Cameca 1280 ion probe at the NORDSIM institute in Stockholm, Sweden.

All data lie within error of the MDF. The results show the expected differentiation between CI and CM chondrites in terms of d34S that has been assigned to the difference in degree of aqueous alteration [3]. Unlike the CM and CI chondrites, the CM- and CI-like clasts both fall in the same range even though the mineral composition suggest different degrees of alteration. The CI-like clasts show lighter isotopic compositions compared to the CI chondrites. More evaluation of the data is needed to investigate the relationship between CI-like clasts and CI chondrites. But also to explain the similarities in S isotopic compositions between CI- and CM-like clasts. The goal is to gain insight in the formation of the sulfides and whether the CI- and CM-like clasts represent CI and CM chondrites or if they differ in origin and formation.

[1] Patzek et al. (2015) *MAPS*, **50**, Abstract #5057 [2] Visser et al. (2017) *MAPS*, **52**, Abstract #6097 [3] Bullock et al. (2010) *MAPS* **45**, 885-898.