WATER AND HEAT: NEW CONSTRAINTS ON THE PARENT BODY EVOLUTION OF CV CHONDRITES

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The mineralogical diversity [e.g., 1, 2] of CV chondrites reflects a complex combination of various processes in both nebular and asteroidal settings [e.g., 1]. There is an abundant literature on CVs, but mostly on individual falls. In the present work, we combined several analytical techniques on a series of 26 CV chondrites (18 Antarctic and 8 non-Antarctic) to constrain their post-accretion history. The thermal history of these samples was previously characterized [3], and we focus here on the aqueous alteration. In a companion abstract, the paleomagnetic record of the same samples will be explored and implications for CV parent body will be discussed [4].

The petrological oxidation state of each Antarctic CV (reduced *vs.* oxidized) was determined based on relative abundances of metal and magnetite by optical microscopy [5] and on magnetic properties. The hydrous mineralogy of the matrices was characterized by infrared (IR) spectroscopy under low pressure (P ~10^{-6} mbar) and at different step temperatures (100°C, 200°C and 300°C). Thermogravimetric analyses (TGA) were performed on bulk chondrites in order to quantify water content and constrain the mineralogy of the water-bearing phases.

The combination of IR and TGA results, taking into account the metamorphic grade and petrographic classification of each sample shows that: *(i)* The hydrous mineralogy of CV chondrites is dominated by a mixture of phyllosilicates and oxy-hydroxides. *(ii)* The relative abundances of phyllosilicates and oxy-hydroxides appear to be distinct between CV_{Red} and CV_{Ox}, consistent with [e.g., 6] *(iii)* The present hydration of the samples is mostly controlled by their metamorphic history. *(iv)* For comparable petrologic types, CV_{Red} and CV_{Ox} contain comparable amount of phyllosilicates in their matrices. The presence of phyllosilicates and absence of metal oxidation in CV_{Red} could be understood by water on rock ratios distinct from CV_{Ox}. Ongoing determination of modal abundances (matrix *vs.* high-temperature components) will allow to evaluate this hypothesis.

References: [1] Krot A.N. et al. (1995) *Meteoritics* 39: 748-775; [2] Howard K. (2010) GCA 74: 5084-5097; [3] Bonal L. et al. 2016 *GCA* 189: 312-337; [4] Gattacceca J. and Bonal L. this volume; [5] McSween H. 1977 *GCA* 41: 1777-1790; [6] Lee M. et al 1996 *MAPS* 31: 477-483