PARENT BODY INFLUENCE ON ORGANIC MATTER: THE MESSAGE FROM PARIS.

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Introduction: Among the CM carbonaceous chondrites, Paris appears to be the less altered and has experienced mild thermal metamorphism [1]. Like other CM, Paris exhibits variations in alteration state within the same sample. This unique object among the CM class should shed new light on the parent body influence on the isotopic and molecular structure of the organic matter in carbonaceous chondrite. The effects of fluid circulation on chondritic organics remain unclear and have implications on the interpretations of the isotopic and molecular signatures of the insoluble organic matter (IOM) in chondrites [2, 3].

Recently, the analysis of organic matter in several pieces of Tagish Lake (ungrouped C2 chondrite intermediate between CI and CM) showing variable degrees of alteration has revealed chemical and isotopic heterogeneities for IOM and soluble compounds [4, 5]. These observations have lead to the conclusion that aqueous alteration has induced modifications of organic matter. It was also concluded that isotopic exchange has altered the D/H signature of the IOM in Tagish Lake. This conclusion is in contrast with the *in situ* NanoSIMS observation that the isotopic signature of organic particles is poorly affected by hydrothermal alteration [3]. The aim of this study is to compare the molecular properties and isotopic signature (measured in situ) of organic particles in the two lithologies found in Paris meteorite.

Experimental: A polished section of Paris meteorite was prepared without epoxy and was studied by NanoSIMS. Several areas on the least and most altered regions were rastered by a focused Cs^+ beam to generate secondary ion images of H^-, D^-, $^{12}C^-$, $^{16}O^-$, $^{26}CN^-$, $^{28}Si^-$ and $^{32}S^-$. The spatial resolution is estimated to be 230 nm. Several FIB (focused ion beam) sections were prepared from the same areas for STXM (Scanning Transmission X-ray Microscopy) experiment to identify the functional groups and TEM (Transmission Electron Microscopy) study of the textural associations between organics and minerals.

Results & Discussion: Like in other CM, Paris exhibits micron size organic particles distributed randomly in the matrix. However, some areas showing a high signal in S and H lack organic particles. TEM should allow the characterization of these phases. Our NanoSIMS data indicate that the D/H ratio of organic particles in the heavily and poorly altered matrices is undistinguishable. Most of the organic particles exhibit $0 < \delta D < 2000$ ‰; these data are consistent with other CM matrices [3]. A few D-rich hot spots are also observed, with a maximum at $\delta D = 7950 \pm 330$‰. C/H and N/C are also similar in the two lithologies, though C/H in Paris appears significantly lower than their counterparts in other CM.

Our data thus indicate that aqueous alteration on CM parent body does not induce a significant modification of the composition of organic particles. Further STXM and TEM observations will be presented and will be used to check these interpretations based on NanoSIMS imaging.

References: [1] Zanda B. et al. 2010, *73rd MetSoc Meeting*, 5312. [2] Alexander C.M.O.'D. et al., 2007. *Geoch. Cosmoch. Acta* 74:4417-4437. [3] Remusat L. et al. 2010, ApJ 713:1048-1058. [4] Glavin D. P. et al. 2010, *73rd MetSoc Meeting*, 5131. [5] De Gregorio B. T. et al. 2010, *73rd MetSoc Meeting*, 5398.