CORRELATED PETROLOGIC AND Mg-ISOTOPIC STUDIES OF AN UNUSUAL IGNEOUS FRAGMENT IN THE PARIS CM CHONDRITE.

C. Caillet Komorowski[1], S. Mostefaoui[1], O. Boudouma[2], G. Godard[3] and M. Fialin[4]. [1]Muséum National d'Histoire Naturelle, LMCM, CP 52, Paris, France. ccaillet@mnhn.fr, [2]UPMC-ISTEP, Paris, [3]IPGP, Paris, [4]Camparis, Jussieu, Paris.

We discovered a unique 360µm-long lithic fragment in the matrix of the Paris CM microbreccia [1]. Global ophitic texture and mineralogy indicate an igneous origin. It contrasts with those commonly observed in chondrules or any known achondrites. The fragment is partially surrounded by a 15µm-thick fine-grained accretion rim distinct and less altered than the matrix, suggesting it was broken before accretion onto the Paris parent body. The fragment is mainly composed of zoned olivine phenocrysts, large sodic plagioclase laths intergrown with interstitial Ca-Fe-rich clinopyroxene and Ni-poor pyrrhotite and pentlandite associated with Fe-Ni metal. X-ray pictures reveal numerous micrometric Na-rich Ca-bearing phosphates either associated with cpx or exsolving in residual alkaline-rich glass. Few small accessory Al-Mg-Ti-bearing chromite and 200nm-sized troilite grains were found in Fe-rich olivine. Nanometric pyroxene crystals are poecilitically enclosed in plagioclase.

Most olivine cystals range from Fo_{71} to Fo_{16}. However a 60µm « relict » crystal core exhibits $Fo_{99\text{-}83}$ overgrown by a Fo_{39} rim. MnO varies between 0.12 and 0.95 wt%. Cpx contains up to 22wt% CaO with high FeO 19.5-25wt% (up to 52% in one crystal). Measurements of pyroxene were tedious due to numerous tiny phosphate inclusions. All analyses showed not less than 1,8wt% P_2O_5. Bulk P_2O_5 of the clast is estimated to 1wt%. Plagioclase laths are oligoclase (Ab_{82}) and have high and variable Al/Mg ratios. The glass contains up to 3.5 wt% K_2O.

To constrain the formation history of the clast, we performed *in-situ* ^{26}Al-^{26}Mg isotopic measurements with the NanoSIMS. Under O^- primary ion beam (~5mm) of 120pA, secondary ions of $^{24,25,26}Mg^+$ were measured in multi-detection mode and simultaneously with ^{27}Al (detected as $^{27}Al^{++}$ at mass 13.49amu) using 4 EMs. The mass resolving power was sufficient to separate all isobaric interferences. Data correction (sensitivity, IMF) for the oligoclase was done using two anorthite and two glass standards. Those for olivine were done using San Carlos olivine.

The Mg isotopic measurements clearly show *in situ* decay of live ^{26}Al at the time of crystallisation of the Paris fragment. Resolvable ^{26}Mg excesses, with $d^{26}Mg$ of up to +30‰, are positively correlated with $^{27}Al/^{24}Mg$ ratio. The inferred initial $^{26}Al/^{27}Al$ ratio is $(5.74\pm0.58) \times 10^{-6}$ (all errors are 2s). Assuming ^{26}Al is widespread in the ESS, this corresponds to an age formation of ~2.2Ma after CAIs (i.e. contemporaneous with chondrules [2,3]).

Our preliminary results reveal a complex history for this igneous volatile-rich uncompletely crystallised fragment that was obviously neither hydrated nor metamorphosed after accretion. It presumably formed during chondrule formation events. Petrography and chemical composition would indicate a distinct origin for the fragment. Oxygen isotopic measurements are in progress to determine its possible origin by igneous differenciation.

References: [1] Caillet Komorowski C. et al. 2011. *Meteoritics & Planetary Science* 46:A35. [2] Mostefaoui S. et al. 2002. *Meteoritics & Planetary Science* 37:421-438. [3] Kita N. et al. 2005. *Chondrites and the Protopanetary Disk*, ed. A. Krot, E. Scott, & B. Reipurth, 558.