**CO-EVOLUTION OF CHONDRITIC ORGANICS AND MINERALS DURING IMPACT METAMORPHISM**

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**Introduction:** Chondritic organic matter might have evolved on its parent body where subjected to shock metamorphism [1-2]. If the effects of shock waves on minerals have been studied in details from the experimental and observational approaches [3-4] little is know on their effect on the carbonaceous component. Here, we experimentally exposed fragments of matrix of the Murchison chondrite to shock loading up to 40 GPa. We describe the effects on the mineralogy as well as on the organic component.

**Methods**: Samples of Murchison meteorite (CM) were obtained through loan by the Museum of Natural History (Chicago). The sample was powdered and pressed to obtain 1 cm in diameter and 1 mm thick pellets. Pellets were then incorporated in a steel container and shocked to pressure of approximately 5-10-20 and 40 GPa, using a single-stage propellant gun (5-10-20 GPa) and a two-stage light gas gun (40 GPa) at the Tokyo Institute of Technology. Samples were then recovered and powdered. IR spectra were measured using the Hyperion microscope at IPAG, and Raman spectra were obtained using the Labram HR at ENS Lyon.

**Mineralogical effect**: IR spectra were obtained in the 2-15 micron region, and provide insights into the nature of the silicate phase present. As shock pressure increases the 3 μm band (-OH and $H_2O$) appears to decrease in intensity with regard to the 10 μm band, indicative of a progressive dehydration of the phyllosilicate phase. For the sample shocked at pressure of 5 to 20 GPa, minor effects are observed on the 10 μm band, which remains broad and structureless, which reveals the presence of a poorly crystalline phyllosilicate [5]. However in the case of the sample shocked at a pressure of 40 GPa, the 10 μm band clearly shows structure, which we interpret by the presence of well crystalline phyllosilicates.

**Impact on the structure of the IOM**: Raman spectra were directly measured on the powdered sample, and analyzed following [6]. When plotted in a FWHM vs Band G diagram, the samples shocked at 5, 10 and 20 GPa do not appear distinct from the initial samples. However in the case of the sample shocked at 40 GPa, a clear distinction is seen with regard to the other samples. A metamorphic trend is observed, which is distinguishable from long duration thermal metamorphism. The origin of this trend and its relation with those observed in chondritic samples will be discussed.

**References:** [1] Quirico et al. (2009) *Met. Soc. Meeting* (2009) [2] Yabuta et al. (2010), *Meteoritics & Planet. Sci*,1446-1460 [3] Ahrens, TJ (1980) *Science* 207, 1035-1041 [4] Gillet, P. et al (2007) Mineralogy of Shocked Meteorites. *GSA* Monograph. Ed. E. Ohtani [5] Beck et al., 2010, *Geochim. Cosmochim. Acta* 74, 4881-4892. [6] Bonal et al., *Geochim. Cosmochim. Acta* 70, 1849-1863.