High pressure melting behavior of EH3 chondrite

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What makes up of the terrestrial planets (such as Mercury, Venus, Earth, Mars)? The answer to this question is fundamentally important to understand the origin and evolution of solar system. Meteorites are left-overs from the formation of the solar system, which are the key to reveal the history of chemical and physical evolution on those planets. It is widely suggested that carbonate chondrite may represent the primitive building block for the Earth. However, evidences from O, Ni, Sm isotopes show that enstatite chondrite could be the most primitive materials for the Earth-Moon system and other terrestrial planets (Dauphas 2017). The composition and evolution of the terrestrial plantes are strictly controlled by the melting relations, subsolidus mineralogy and element partitioning of the starting meteorites. Therefore, it is critical to understand the melting behavior of enstatite chondrite at high pressure and temperature.

In this study, we conducted high-pressure melting experiments on Sahara 97159 by piston-cylinder press. The aim of our work is to examine the effect of pressure, temperature and oxygen fugacity on the melting relations and crystallization sequences. Our results are expected to provide insights into the composition and evolution of planetary bodies. Some premililary results were shown in figure 1.

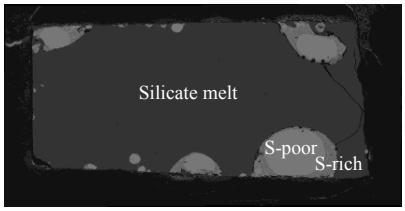

Figure 1. Scanning electron microscope composition images of the quenched samples at 1GPa, 1600°C. Two immiscible liquids (S-rich and S-poor melts) and one homogenous silicate melt are the run products.

Nicolas Dauphas, (2017) *Nature*, **541**, 521-524.