Liquid immiscibility and platinum group element diffusion in L6-S5 ordinary chondrite

R.B.SCHAAN[1] D.C.GRINGS[2] M.E.B.GOMES[2] R.V.CONCEIÇÃO[2] J.A.QUILLFELDT[2] M.E.ZUCOLOTTO[1]

[1]Departamento de Geologia e Paleontologia, Museu Nacional, Univ. Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brasil. (renatabrandelli@gmail.com)

[2]Univ.Federal do Rio Grande do Sul, Porto Alegre, RS, Brasil.

Introduction: Chondrites are the most pristine rocks in the Solar System. They can give important information about the early stages of planetary evolution. The Putinga meteorite fell on the city of Putinga, Brazil, in August 16th 1937. It's classified as a L6-S5 ordinary chondrite (OC), meaning intense and frequent shock events took place and altered primary features of the chondrite. Platinum group elements (PGE) are easily found in Fe-Ni meteoritic metal due to its siderophile nature [1]. Highly siderophile elements (HSE) are useful to understand metal-silicate relations and metal melting processes [2].

Methods: The chondrite was analysed in thin section using scanning electron microscope (SEM) for identification of opaque veins and melt pockets. The relative abundance of HSE of platinum group on metallic phases of specific fusion features is currently being determined with electron microprobe analysis (EMPA). Raman spectroscopy technique was also applied to observe any possible high pressure phase transformation.

Results and Discussion: Chemical evidence suggests that secondary metamorphic processes related to shock events are responsible for remobilizing and fractionating elements in meteorites, indicating an important role in core formation. Melt pockets and opaque veins are subproduct of intense shock events in chondrites. They display liquid immiscibility textures with two main different phase composition: silicate and sulfide. PGE analysis in these features may contribute to understand the diffusion processes in metallic melt and solid phases and silicate-metal fractionation. Calculated olivine and pyroxene end-members average is Fa24,6 and Fs21,07 respectively, in agreement with previews measures [3, 4]. The Raman Spectroscopy data did not revealed significant low-high pressure phase transformation in this chondrite.

References: [1] Gilmour et al. (2015). *78th Annual Meeting of the Meteoritical Society*. LPI Contribution No. 1856, p.5336 [2] Horal et al. (2009). *Geochim. Et Cosmoc. Acta* 73 (2009) 6984–6997 [3] Keil et al. (1978). *Meteorit. Planet. Sci.* 13(2), 165-175. [4] Symes et al. (1970) *Mineral. Mag*. 37(290), 721-723.