RAPID COOLING OF CHONDRULES TO PREVENT EVAPORATION OF FENI: CONSTRAINTS FROM EXPERIMENTAL CHONDRULES. K.E. Cervantes-de la Cruz[1], P. Hernández-Reséndiz[2] , A. Segura[3], H. Cruz-Hernández[3], B.S. Ángeles-García[4], and A. U'Ren[3],. [1]Departamento de Física, Licenciatura en Ciencias de la Tierra, Facultad de Ciencias, Universidad Nacional Autónoma de México (UNAM), *Av. Universidad 3000, CDMX, México Z.P.04510, karina-cervantes@ciencias.unam.mx, [2]Posgrado en Astrofísica, UNAM*, [3]Instituto de Ciencias Nucleares*, Instituto de Geología UNAM*.

Introduction: Main conponents in chondrites are chondrules, matrix, Fe-Ni and sulphide minerals. Metal origin in chondrites are studied by several authors as Righter et al. [1] and Campbell et al. [2]. They emphatized on the "interplay between metal and silicate during chondrule formation and processes as volatilization/condensation of FeNi" [2]. The main objective of this work is to compare the grains of metal generated by olivine melted [3] against grains of FeNi of chondrules.

Methodology: We melting olivine precursors using a 50 W infrared laser at 0.77 atm according to [3] work. Thermal history are measured with a pyrometer. Natural chondrite and experimental chondrule are analized by SEM and EPMA techniques at Laboratorio Universitario de Petrología and Laboratorio de Microscopia Electrónica del Instituto de Geología, UNAM.

Results: Experimental chondrules were melted in temperature range from 800 to 1800 °C and crystallization take only a few cent of seconds, according to [3]. Tiny Fe-Ni grains are condensed at surface, into cristals and between olivine bars (Figure 1). This metal distribution is similar to metals in natural chondrules, as showing in the Figure 2.

Discussion and conclusion: Cooling rates at chondrule literature were estimated from 100 to 1000 °C/h [2], but quick time are necessary to prevent the volatization of Fe-Ni. Cristals edges are natural frontiers were FeNi condensate during crystallization of chondrules. In future work we will characterize emission spectra of Fe during experimental chondrule melting.

References: [1] Righter K. et al. (2005). *Geochim. Cosmochim. A.* 69:3145-3158 [2] Campbell A.J. et al. (2005) *Chondrules and Protoplanetary Disk 2005* ASP conference series, 341:. 407-430. [3] Hernández Reséndiz P. et al. (2017) *Chondrules and Protoplanetary Disk 2017*, Abstract #2020. [4] Author I. J. (2002) *LPS XXXIII*, Abstract #1402.

Acknowledgments: Investigation supported by PAPIIT projects IA105515, IA101312 and IA203616. We are gratefull with Carlos Linares López by EPMA analysis, Claudia C. Camargo Raya and Raúl Rangel by technical support. We are gratefull with Taller de Mineralogía y Petrología, Facultad de Ciencias, UNAM.

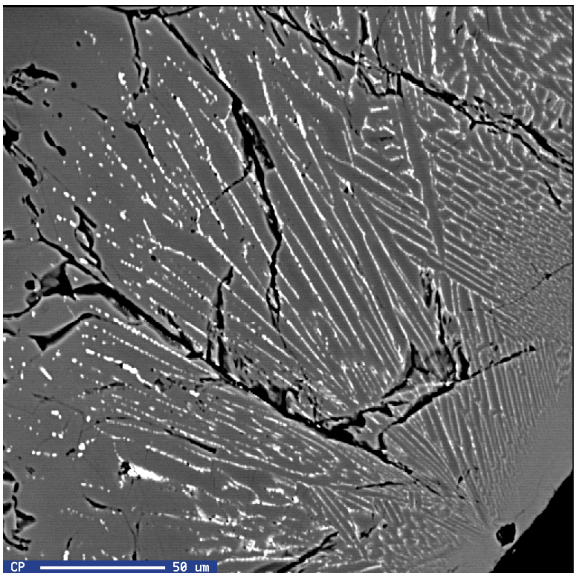

Figure 1. Chondrule-like experiment. FeNi tiny particles sorround olivine cristals [according 3].

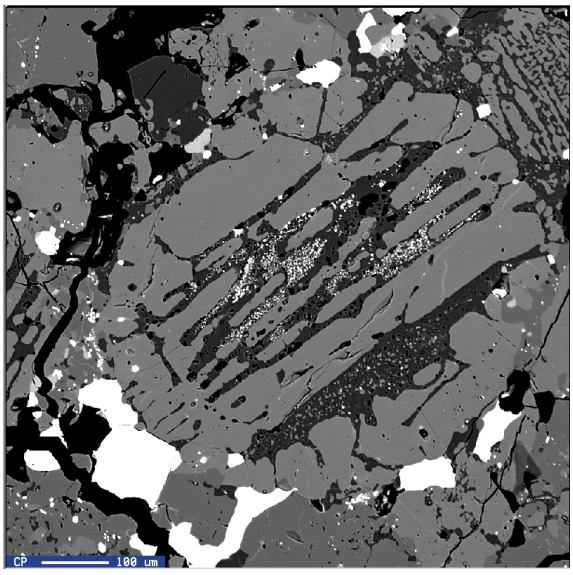

Figure 2. BO chondrule from Nuevo Mercurio H5 meteorite. FeNi tiny particles are between and into olivine bars.