GERMANIUM ISOTOPIC COMPOSITION OF PALLASITES.

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Pallasites are exceptional meteorites that are composed of about 65% cm-scale silicates (olivine ± pyroxene) and 30% Fe-Ni metal, with 5% of chromite, troilite (FeS), phosphur (schreibersite (FeNi)3P), phosphate. They have longer been interpreted as the result of mixing between Fe-Ni metal liquid and mantle olivine. They would represent the core-mantle interface of differentiated planetesimals in the first 10 Ma of the Solar system, implying metal-silicate equilibrium at high pressure [1]. Recent studies based on chemical zoning in olivine, cooling rate of metal phase, remnant magnetization in submicrometric Fe-Ni inclusions in olivines, argue that olivine and metal are not in equilibrium, and require impact processes. Germanium, a moderately siderophile and volatile element can be a potential tracer for testing these hypotheses.

Samples have been selected from the Main-Group pallasites (MGP) and Eagle Station Trio (ESP). Ge elemental and isotopic analyses have been performed on pure metal and olivine separates at the CRPG-Nancy [2,3]. Germaniun concentrations in metal range from 45-65 ppm. Those in olivine are extremely low, from 27-63 ppb, compared to the Earth silicate reservoirs (0.8-1.5ppm). Germanium isotopic composition in metal and silicates phases allow to calculate a positive isotopic fractionation $\Delta^{74/70}Ge_{metal\text{-}olivine}$ of +0.8 to +0.96‰ that is in the same direction than the Earth system [3]. Whereas $\delta^{74/70}Ge$ values in metal and olivine of MGP are lower than Fe-meteorites and Earth silicate reservoirs, respectively, $\delta^{74/70}Ge$ values for Eagle Station are strongly fractionated towards high positive values. These strongly distinct Ge isotopic compositions of MGP and ESP inversely mirror oxygen isotope signatures [4]. Impact processes versus differentiation of distinct parent bodies will be examined to discuss pallasite formation.

References: [1] Scott E.R.D. and Taylor G.J. (1990) LPSC 21st 1119 - 1120. [2] Luais B. (2007) *EPSL 262*: 21-36. [3] Luais B. (2012) *Chem Geol 334:* 295-311. [4] Clayton R.N and Mayeda T.K (1996) *GCA 60:* 199-2017.