

# **Sulfur isotopes fractionation between metal and silicate at high pressure and high temperature**

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In this study we assess whether the sulfur incorporated into the core left an isotopic signature on the bulk silicate Earth as predicted by Labidi et al. (2013). Until very recently, reports of the isotopic composition of sulfur in mantle rocks (e.g. mid-ocean ridge basalts MORBs) yielded identical values from those reported for chondritic material. This has been recently questioned through new data on MORBs showing that the ratio of  $^{34}\text{S}$  to  $^{32}\text{S}$  in Earth's mantle is  $\sim 1\%$  lower than that of chondrites (Labidi et al., 2013). These new results are based on a new analytical method developed at IPGP providing sulfur extraction yields on silicate glasses much higher than has previously been possible. This allows the precise determination of S multi-isotope compositions in silicate glass as well as metallic compounds. We have conducted experiments to measure the S isotopic fractionation between liquid (Fe, S) compounds and silicate melt at high pressure and high temperature (HP-HT) conditions in large volume press experiments (Piston-cylinder press). Following these results, we evaluate if the difference in S isotopes between Earth's mantle and chondrites corresponds to the one measured in these core segregation laboratory experiments. This provides important constraints on the budget of sulfur in the core and on the highly debated issues of volatile elements accretion and the nature of Earth's building blocks.