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In situ ion probe measurement of sulfur isotopic compositions of sulfide in enstatite chondrites

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Sulfur is a major component in enstatite chondrites constituting several sulfides of unusual compositions, e.g. Cr-Ti-bearing troilite. Hence, sulfur isotopes may carry information about the metamorphic and shock history of enstatite chondrites. Previous analyses of sulfur isotopes mainly focussed on bulk analyses or measurement of leachates, which cannot resolve internal equilibrium or disequilibrium processes [1].

We present first results of high precision sulfur isotope analyses of troilite in E-chondrites measured at the Heidelberg Ion Probe facility with a Cameca IMS 1280-HR ion probe. We standardized against the Canyon Diablo troilite with an internal 1σ -precision of $\pm 0.08\text{--}0.09\text{‰}$ ($^{33}\text{S}/^{32}\text{S}$) and $\pm 0.09\text{--}0.16\text{‰}$ ($^{34}\text{S}/^{32}\text{S}$). Troilite in E-chondrites showed only small inter- and intra-sample variation in isotope compositions with slightly negative $\delta^{34}\text{S}$ -values with no major control of specific mineral paragenesis on composition. No $\Delta^{33}\text{S}$ -anomaly could be detected yet.

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[1] Defouilloy, C. et al. (2016) GCA 172, 393–409.

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