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Chondritic $\delta^{34}S$ in rocks from the Earth´s mantle

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Contradictory evidence from chondritic S-Se-Te elemental ratios in the bulk silicate Earth[1] and fractionated $\delta^{34}S$ in the MORB mantle[2] raised the question, if the budget of S in the BSE is controlled by late accretion or core formation processes. To resolve this issue, we determined $\delta^{34}S$ of fresh mantle pyroxenites and fertile lherzolites from various localities.

Pyroxenites and lherzolites from the Balmuccia peridotite massif and one Lanzo peridotite yield a restricted range of $\delta^{34}S_{VCDT}$ from 0.16 ‰ (±0.17, 2SD) to 0.67 ‰ (±0.07 2SD). The data show no dependence of $\delta^{34}S_{VCDT}$ on S content or mass fractions of other elements. The average of 0.46‰ (±0.33 2SD, n=14) overlaps with the range of values of bulk carbonaceous chondrites, consistent with S-Se-Te concentration ratios and the late accretion scenario.

[1] Wang, Z. & Becker, H. (2013), Nature, 499, 328-31.
[2] Labidi, J. et al. (2013), Nature, 501, 208-211.

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