

## **In-situ Sr isotope signatures of garnet peridotite from the European lithospheric mantle**

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Garnet peridotites represent some of the deepest rock samples on Earth available. However, mantle xenoliths from the Central European Volcanic Province are generally limited to spinel peridotites and only rarely comprise garnet-bearing assemblages. Remarkably, garnet peridotite xenoliths have previously been reported in alnöites (melilite-bearing ultramafic lamprophyres) from the Delitzsch carbonatite complex [1]. In order to better understand how the host alnöitic magma interacted with the deep lithosphere, we have investigated the radiogenic Sr isotope composition of a sheared garnet lherzolite (6.1 GPa [1]) that was entrained by an alnöite from the Delitzsch complex, Germany. We analysed clinopyroxenes from this xenolith in-situ for their Sr isotope composition using a 193 nm Excimer laser ablation system coupled with the Neoma MC-ICPMS/MS. The use of SF<sub>6</sub> gas in the Neoma reaction cell enables the measurement of SrF<sup>+</sup> ions free from isobaric interferences [2].

Our data reveals initial <sup>87</sup>Sr/<sup>86</sup>Sr ratios from 0.7045±15 to 0.7060±13 for the sheared garnet lherzolite, which mostly overlap with previously reported bulk rock initial <sup>87</sup>Sr/<sup>86</sup>Sr ratios (0.704 and 0.70336 [3,4]) of the host alnöite. These findings support a model where the lower lithosphere was refertilized during magmatism, which may have weakened the formerly thick lithosphere of the northern Bohemian massif, ultimately leading to the destruction of the lower 50-70 km of the lithosphere [1].

[1] Röper et al., in review

[2] Craig et al. (2021), Anal. Chem. 93, 10519-10527

[3] Wand et al. (1987), Fifth Working Meeting Isotopes in Nature, 421-436

[4] Krüger et al. (2013), Chem. Geol. 353, 140-150