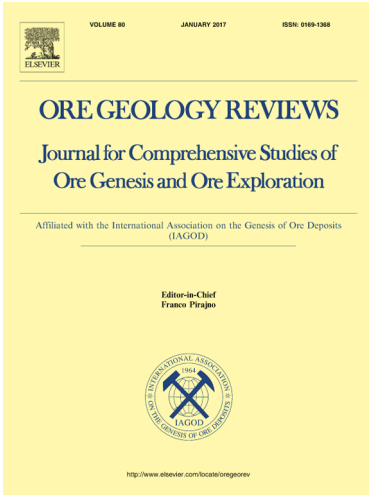

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Laurite and zircon from the Finero chromitites (Italy): new insights into evolution of the subcontinental mantle

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Abstract

Chromitites enclosed within metasomatised Finero phlogopite peridotite (FPP) contain accessory platinum-group minerals, base metal (BM) sulfides, baddeleyite, zircon, zirconolite, uraninite and thorianite. To provide new insights into mantle-crustal interaction in the Finero lithosphere this study evaluates (1) the mineral chemistry and Os-isotope composition of laurite, (2) the crystal morphology, internal structure, *in-situ* U-Pb, trace element and Hf-isotope data of zircon from two chromitite localities at Alpe Polunia and Rio Creves. The osmium isotope results reveal a resticted range of 'unradiogenic' $^{187}Os/^{188}Os$ values for laurite at Alpe Polunia (0.1247–0.1251, mean 0.1249±0.0001). Re-Os model ages (T_{RD}) of laurite reflect an Early Paleozoic partial melting event (*ca* 450 Ma or older), presumably before the Variscan orogeny. The Os isotopic composition of laurite/chromitite probably preserves their mantle signature and was not affected by later metasomatic processes. U-Pb and Hf-isotope data show that the Finero chromitites have distinct zircon populations with peculiar morphology, internal cathodoluminescence textures, trace-element composition and an overall U-Pb age span from ~310 Ma to 190 Ma. Three age peaks at Rio Creves (220±4 Ma, 234.2±4.5 Ma and 277.5±3.2 Ma) are consistent with a prolonged formation and multistage zircon growth, in contrast to the common assumption of a single metasomatic event during chromitite formation. The trace-element signatures of zircons are comparable with those of mantle-derived zircons from alkaline ultramafic rocks, supporting the carbonatitic nature of the metasomatism. Hf-isotope compositions of the Finero zircons, with εHf values ranging mainly from –