

Peridotite xenoliths from Hirzstein (Northern Hessian Depression): preliminary data

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The alkali olivine basalt of Hirzstein at the outskirts of Kassel (Germany) is one of the Cenozoic lava occurrences of the Northern Hessian Depression which carries abundant mantle peridotite xenoliths (Oehm et al. 1983). These xenoliths come from the mantellic root of the southern margin of the Rheno-Hercynian Zone of the European Variscan Orogen close to its contact with the Mid-German Crystalline Rise.

Hirzstein xenoliths are green to yellow, oval to rectangular in shape. Their diameter is from 4 to 11 cm. Contact with host basalt is sharp, the grains are up to 6 (olivine) – 4 (ortho- and clinopyroxene) mm. The xenoliths are protogranular to porphyroclastic, the films of glass are common in interstices. They have the composition of cpx-poor lherzolite (7 samples) or harzburgite (1 sample).

Forsterite content in olivine allows to distinguish two groups of the xenoliths: A (Fo=89.9-91.4%), B (Fo=87.6-89.3 %). All but one xenolith from group B plot into OSMA field by Arai (1994). Orthopyroxene occurring in group A xenoliths has Mg#=0.90-0.92 and contains from 0.11 to 0.22 atoms of Al pfu. It shows LREE depletion (La/LuN=0.12-0.38). Clinopyroxene (Mg#=0.90-0.92) contains Al=0.13 to 0.25 atoms of Al pf and is LREE enriched (La/LuN= 5.54-25.47), trace elements patterns show negative anomalies in Nb, Pb, Ce, Zr-Hf and Ti. Spinel is characterized by high Mg and low Cr content (Mg#=0.66-0.76, Cr#=0.12-0.40).

Group B orthopyroxene (Mg#=0.88-0.89) contains 0.11-0.22 atoms of Al pfu and is depleted in LREE (La/LuN=0.05-0.84). Clinopyroxene (Mg# 0.87-0.89) contains 0.17-0.31 atoms of Al pfu. The trace elements patterns of clinopyroxene show LREE enrichment (La/LuN=6.19-15.19) and Nb, Pb, Ce, Zr-Hf and Ti negative anomalies which are less pronounced compared to those in group A. Spinel has very low Cr (Cr#=0.13-0.18, Mg#=0.68- 0.70), The Zr-Hf anomaly is positive in lherzolite 3637 and spinel is characterized by Cr#=0.49-0.52 and Mg#=0.49-0.50.

The Hirzstein xenolith suite studied by us is dominated by lherzolites, which are poor in clinopyroxene. The composition of olivine is similar to that of olivine occurring in xenolith suites of the Lower Silesian domain of Saxo-Thuringian Zone and Central Sudetic unit (located in the foreland of the Saxo-Thuringia). The Hirzstein orthopyroxene is, however, significantly more aluminous. The clinopyroxene is supposedly a late addition to the host rocks. More data on xenoliths from Northern Hessian Depression are needed for precise characterization of underlying mantellic root of the Variscan Orogen.

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Oehm J., Schneider A., Wedepohl K. H., 1983. Upper mantle rocks from basalts of the Northern Hessian Depression. *TMPM* 32, 25-48.