

# Rocks and ores of the PGE-bearing Vuruchuaivench massif (Kola Peninsula, Russia)

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The early Palaeoproterozoic mafic-ultramafic layered Monchegorsk pluton is located in the north-eastern Fennoscandian (Baltic) Shield, on the Kola Peninsula. The Monchegorsk pluton is the second largest layered pluton in Europe (ca. 60 km<sup>2</sup>), and consists of two branches: one N-E trending (the Nittis, Kumuzh'ya, and Travyanaya (NKT) massifs), and sublatitude trending (the Sopcha, Nud, and Poaz massifs). The Vuruchuaivench massif occurs at the marginal part of the Nyud-Poaz intrusions (Smolkin et al. 2003). The Vuruchuaivench massif entirely consists of hydrothermally altered gabbro-norite that is exposed in separated outcrops (ranging from meters to tens meters) north-eastwards for a distance of 7–8 km, and disappears in Lake Imandra (Ivanchenko 2008). The width of the exposure is 1.5–2.0 km. The intrusive is known for its PGE mineralization (prognostic resources 100 t of PGE). Reef ore body is similar with Platinova (Skaergaard) and Sonju Lake (Duluth Complex) PGE reefs. Rock ores are presented by metasomatized taxitic leucogabbro-norites and anortosites (Knauf et al. 2008; Smolkin et al. 2003). The reef ore body hosts low-sulphide Ni-Cu and PGE mineralization. Average content of PGE in rocks is 2.0–2.5 ppm, samples containing 19 ppm are also found (Knauf et al. 2008). The ratio of Pd/Pt varies from 2–8:1.

The samples (13 samples) were selected from the detailed study area (0.03 km<sup>2</sup>). Petrographic features were studied using optical microscope and X-ray analysis. The trace elements and precious metals analysis was performed with ICP-MS.

Isotopic research was provided with SHRIMP-II. All analyses were carried out in A.P. Karpinsky Russian Geological Research Institute (VSEGEI) in Saint-Petersburg.

The presence of a propylite rock was established for the first time in the territory of massif. Two propylite groups that differ mineralogically were identified. PGE mineralization is associated with the quartz-chlorite-albite group, whereas mineralization is unrelated with another, the albite group. There is a difference in total REE content in gabbro-norites and propylites. Propylites of first group differ from second group and gabbro-norites by a noticeable spread of values in REE content. The similarities of REE patterns in all rocks may indicate a genetic relationship. Arsenides and sulphoarsenides are predominant among the platinum group minerals in the Vuruchuaivench massif. The age of the propylites (based on Rb-Sr isotopic system) is 2,470 ± 130 Ma. The Initial <sup>87</sup>Sr/<sup>86</sup>Sr ratio ( $I_{Sr} = 0.703537$ ) and  $\delta^{34}S = 1.4\%$  (Grokhovskaya et al. 2009) indicate a slight part of a crustal component in formation of rocks and ores of the Vuruchuaivench massif.

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