

Origin of high-alumina and low-magnesia mantle eclogites from the Catoca pipe (N.-E. Angola)

N.M. KOROLEV^{1*}, L.P. NIKITINA^{1,2}, E.O. DUBININA³, V.N. ZINCHENKO⁴, A.E. MELNIK^{5,1}
AND F. JOÃO⁴

¹Institute of Precambrian Geology and Geochronology RAS, St. Petersburg, Russia (*correspondence: n.m.korolev@ipgg.ru)

²Institute of Earth Sciences, St. Petersburg State University, St. Petersburg, Russia

³Institute of Geology of Ore Deposits, Petrography, Mineralogy and Geochemistry RAS, Moscow, Russia

⁴Geological Department of SM Catoca, Angola

⁵National Mineral Resources University (Mining University), St. Petersburg, Russia

The first petrography and mineralogy results of the mantle eclogites from the Catoca pipe were published in the article [1]. High-alumina (hi-Al₂O₃) eclogites (6 samples) consist of high-Na omphacite (Jd 51-67) and garnet (Prp30-33 Alm28-29 Grs37-41). There are small quantities of kyanite in each sample (up to 15 vol.%). Low-magnesian (lo-MgO) eclogites (9 samples) are biminerallitic, the composition of garnet: Prp 35-53 Alm 28-45 Grs 16-28; the composition of omphacite: (Jd 32-57).

The isotopic and geochemical data support the subduction origin of the eclogites from the Catoca pipe.

REE_N patterns, Y, Zr, Li contents and Zr/Sm, Zr/Hf, La/Sm ratios of reconstructed whole rock of hi-Al₂O₃ eclogites reveal the greatest similarity with ophiolitic gabbro and modern oceanic gabbro. Weak Eu peak together with an increased concentration of Sr in garnets are also indicative of plagioclase-bearing protolith.

REE_N patterns, Y, Zr, Li contents, Zr/Sm, Zr/Hf, La/Sm ratios and depleted LREE_N of reconstructed whole rock of lo-MgO eclogites may indicate that these eclogites were formed as a product of a N-MORB restite transformation. The geochemical modeling results of melting at T 1100-1200°C and P 30-40 kbar (partition coefficients from [2]) support the introduced assumption.

The oxygen isotope composition of rock-forming minerals of lo-MgO eclogites ($\delta^{18}\text{O}(\text{cpx})$ 6.2-7.4, $\delta^{18}\text{O}(\text{grt})$ 6.2-7.1) are also consistent with the assumption.

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[1] Nikitina *et al.* (2014) Precambrian Res **249**, 13-32.

[2] Green *et al.* (2000) Lithos **53**, 165-187.