

# CHEMISTRY OF CHROMIAN SPINEL AND ISOTOPIC DATA IN HIGH-Mg ROCKS FROM THE MORUNGAVA INTRUSION, CRETACEOUS PARANÁ MAGMATIC PROVINCE, SOUTHERN BRAZIL

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The Paraná magmatic province in South America and the minor Etendeka remnant in Namibia, Africa, consist mostly of basalt and rhyodacite. This province is one of the largest igneous provinces (LIPs) in the world, closely related with the Lower Cretaceous opening of the South Atlantic Ocean. The regional distribution of magmatism and the distinct magma types involve different mantle sources. The Morungava intrusion is located in the southeastern part of the Paraná basin, at the foothills of the Serra Geral plateau, and displays distinctive intrusive forms and geochemical differences with respect to the main lava sequence. Composition of chromiferous spinel and associated olivine of four picritic rocks and one tholeiitic rock of the Morungava mafic-ultramafic sill-like intrusion are reported here, to point out the chemical variations of this phase and early crystallization processes that caused crystallization of spinel in primitive magmas. The Pb isotope data from these rocks added to the new Sr-Nd data are interpreted. Samples were selected from five different drill cores with high MgO and Cr contents. Two types of chrome-spinels have been identified in olivine gabbro-norites and olivine wehrlites from the intrusion. Type I – variation limited to the core of high Mg idiomorphic olivine crystals, with high Cr<sub>2</sub>O<sub>3</sub> (28 – 35 wt. %), Al<sub>2</sub>O<sub>3</sub> (30 – 34 wt. %), MgO (12.6 – 14.6 wt. %) and low TiO<sub>2</sub> (0.5 – 0.8 wt. %) contents. The Type II crystals occur in the interstices between olivine and clinopyroxene, with high TiO<sub>2</sub> (2 – 15.8 wt. %) and lower Al<sub>2</sub>O<sub>3</sub> (5.2 – 10.5 wt. %), Cr<sub>2</sub>O<sub>3</sub> (10 – 30 wt. %) and MgO (2.8 – 7.6 wt. %). The Morungava spinels show a wide spectrum of Al and Cr and trend to Fe and Ti-rich compositions, recording a complex history of extensive reactions that started in intratelluric magmatic chamber and finished with trapped interstitial *in situ* intercumulus liquids. The decreasing Al and increasing Fe and Ti of spinel seems to be mainly the result of decrease of Mg in the locally coexisting melts and favourable cationic substitutions in the lattice. The High-Mg rocks show initial Sr, Nd (t = 135 Ma) and Pb isotopic compositions (<sup>206</sup>Pb/<sup>204</sup>Pb = 18.055-18.109, <sup>207</sup>Pb/<sup>204</sup>Pb = 15.50-15.56, <sup>208</sup>Pb/<sup>204</sup>Pb = 37.976-38.133, <sup>143</sup>Nd/<sup>144</sup>Nd = 0.512777-0.512834, <sup>87</sup>Sr/<sup>86</sup>Sr = 0.705201-0.705862). These isotopic data are different from other Paraná magma types and confirm the primitive characteristics of the Morungava magma, close to Tristan da Cunha plume and OIB isotopic composition.

Key words: Cr-SPINEL; Pb-Sr-Nd ISOTOPES; MORUNGAVA INTRUSION; PARANÁ MAGMATISM.