

Mineralogical and Geochemical Discrimination Between K-Rich Syenites in Northeastern Brazil

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Based upon mineralogical and geochemical characteristics, silica-saturated to oversaturated, shoshonitic and ultrapotassic syenites were recognized in northeastern Brazil. Shoshonitic syenites present early crystallized plagioclase, partially resorbed by perthitic alkali feldspar. The mafic minerals are diopside, frequently transformed to edenite and/or hornblende in the late magmatic stages. On the other hand, ultrapotassic syenites show only homogeneous alkali feldspar (Or > 90%), and pyroxene evolving from diopside to aegirine. Amphibole grains are late magmatic to *subsolidus*, and belong to winchite-richterite series; Mg-riebeckite is less frequent. Mica is frequently observed in both syenites, with composition varying from Mg-biotite to phlogopite. K₂O contents in these syenites, vary between 9-10wt.% in the ultrapotassic types, with lower values (6-8wt.%) in the shoshonitic ones. Ultrapotassic syenites usually have K₂O/Na₂O ratio higher than 3. The isotopic and trace element composition of both syenite types suggests a metasomatized-mantle source in a subduction-related tectonic setting. In the studied region both syenites are normally associated, and the field relations, as well as geochronological data, point out that shoshonitic syenites are older than the ultrapotassic ones. We concluded that, it is possible, through mineralogical and geochemical parameters discriminate between two different types of potassium-rich, alkaline silica-saturated magmas, produced by previous subduction-modified mantle sources, and in different tectonic settings.