

Homogeneous $\delta^{18}\text{O}$ Signature and the Peritetic Melting Origin of the Pedra Branca Granodiorite Pluton, State of Paraíba, NE Brazil

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The Neoproterozoic, metaluminous Pedra Branca granodiorite in the central region of the state of Paraíba, NE Brazil, represents one of the three examples of calc-alkalic granitoids (Pedra Branca, Angico Torto and Coronel João Sá plutons) in the Borborema province, in which magmatic epidote (mEp) and clinopyroxene are together at hand sample scale. The Pedra Branca pluton, which intruded low-grade metamorphic rocks of the Cachoeirinha-Salgueiro foldbelt (CSF) at ~ 6 kbar pressure, is remarkably homogeneous from the chemical viewpoint, with $\text{SiO}_2 \sim 66.5\%$, $\text{Al}_2\text{O}_3 \sim 15\%$, $\text{CaO} \sim 4\%$ and $\text{MgO} \sim 2\%$, in samples taken 1 km apart from each other. Chondrite-normalized REE patterns are nearly coincident, with discrete Eu anomaly. These samples exhibit high $\delta^{18}\text{O}$ as all mEp-bearing calc-alkalic plutons in the CSF, but very homogeneous ($+11.8 \pm 0.2\text{‰}_{\text{SMOW}}$). Zr saturation indicates liquidus temperature slightly above 800°C .

Amphibolite xenolith is commonly found in almost all mEp-bearing calc-alkalic plutons in the CSF which has led to the assumption that this calc-alkalic magma may represent partial melt of an amphibolite source. According to experiments (e.g. Thompson & Ellis, 1994), melting involving zoisite + amphibole + quartz produces liquid + clinopyroxene between 10 and 25 kbar at a temperature slightly above 800°C . Regarding the chemical/isotopic homogeneity of this pluton, presence of clinopyroxene, and the estimate liquidus temperature, we assume that it may represent a peritetic melting of an amphibolite (zoisite + amphibole + quartz) source.