

## Study of Leucite-Nepheline-Diopside and Kalsilite-Nepheline-Diopside phase diagrams at 4GPa under dry conditions

SOUZA, M.R.W.<sup>1\*</sup>; CONCEIÇÃO, R.V.<sup>1</sup>; VINÍCIUS, M.<sup>1</sup>; CEDEÑO, D.G.<sup>1</sup>; QUINTEIRO, R.V.S.<sup>1</sup>; CARNIEL, L.C.<sup>1,2,3</sup>

<sup>1</sup>Laboratory of Geochemistry and Experimental Petrology (LAGEPE) - Universidade Federal do Rio Grande do Sul, Instituto de Geociências, Porto Alegre, RS, Brazil

\*Corresponding author: marcio.souza@ufrgs.br

We have experimentally investigated the Kalsilite–Nepheline–Diopside and Leucite–Nepheline–Diopside phase diagrams, both at 4.0 GPa (~120km depth), temperatures up to 1400°C and dry conditions, aiming to better understand the role of potassium and sodium in silica-undersaturated environments in the Earth’s upper mantle. The experiments were carried out in a 1000 ton hydraulic press with toroidal chambers, in 8-10 hours long runs, and the products were analyzed by XRD, EPMA and SEM-EDS. In the Lct-Nph-Di phase diagram we can highlight three of the experiments, which have key features: (A) the pseudo-eutectic Kls+Nph+Di+liquid (Lct<sub>62</sub>Ne<sub>29</sub>Di<sub>9</sub>) at 1000°C; (B) the pseudo-eutectic Kls+Di+Wo+liquid (Lct<sub>73</sub>Nph<sub>18</sub>Di<sub>9</sub>) at 1000°C; and (C) the Kls+Di+liquid (Lct<sub>62</sub>Nph<sub>22</sub>Di<sub>16</sub>), at 1200°C, which is a high thermal point who sets the evolution of melts compositions from potassic to sodic, or from potassic to ultrapotassic. In the Kls-Nph-Di phase diagram, we determined the pseudo-eutectic Kls+Nph+Di+liquid (Kls<sub>47</sub>Nph<sub>43</sub>Di<sub>10</sub>), with minor amounts of spinel, at 1100°C. Our data suggests that pressure up to 4 GPa extends potassium dissolution in Nph (up to 39% molar) and sodium in Kls (up to 27% molar). Also, data shows positive correlation between K<sub>2</sub>O and SiO<sub>2</sub> concentration in magmas, which corroborate with conclusions from other studies [1; 2]. In new experiments, we added C-O-H volatiles to the studied systems, aiming to better correlate our results to the source environment of kimberlites and carbonatites.

[1]Conceição, R.V.; Green, D.H. (2000). G3, #2000GC00071.

[2] Conceição, R.V.; Green, D.H. (2004). Lithos 72:209-229