

Partitioning of nitrogen during partial melting of phlogopite-rich metasomes

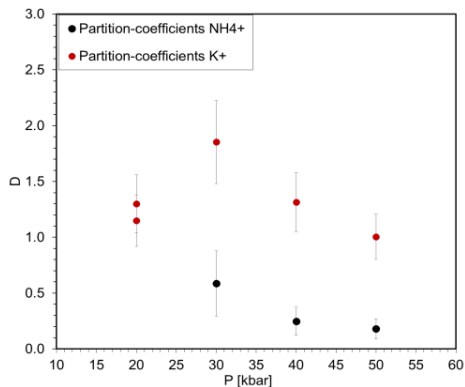
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Nitrogen, the most abundant element of Earth's atmosphere, is also an important constituent in high pressure fluids, melts and mineral phases. The recycling of surficial nitrogen to mantle depths is thought to be connected to potassium-bearing silicates in subduction zones, whereby micas play an important role. Phlogopite is stable in ultramafic rocks of the lithospheric mantle, especially metasomatic assemblages. We conducted experiments at 2-5 GPa on nitrogen-doped glimmerites (phlogopite >90% with minor clinopyroxene) to examine the partitioning of the ammonium-ion for phlogopite/melt during partial melting at various P-T conditions, with fO_2 controlled by the C-CO buffer. Samples were analysed with electron microprobe using a 20 μm defocussed beam and calibration of nitrogen on the synthetic ammonium bearing feldspar buddingtonite.

First results show that phlogopite/melt partition coefficients for ammonium lower from 0.6 to 0.18 with increasing pressure from 3 to 5 GPa, in contrast to potassium, whose coefficients range between 1.8 to 1.



The solubility of ammonium into the melt increases with higher pressures. This seems to be the major cause for the change in partitioning coefficients since ammonium contents of phlogopite in all experiments are relatively constant.