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# Experimental Modeling of Mantle-Crust Interaction: the Influence of Fluid on Melting, Phase Composition and Critical Relationship Between Melt and Fluid

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Geophysical and geochemical data indicate for large-scale exchange of matter between crust and mantle. The most important exchange mechanism is the subduction of oceanic slab, leading to formation of volatile-enriched mantle reservoirs with protoliths subducted slab.
To determine peculiarity of magma generation processes from such source and effect of fluids ($H_2O$, $H_2O$ + $CO_2$, $H_2O$ + HCl) on melting, phase composition and critical relationship between melt and fluid system peridotite-basalt -(Na, K)2$CO_3$ were studied experimentally at 4GPa, 1400°C.
Experiments were carried out in anvil-with-hole apparatus by quenching technique with Pt-Pt-peridotite ampoules. Products experiments - polished quench samples, were analyzed by electron microprobe.
Type of fluids directly influences on phase relations and composition melts, formed by partial melting of initial sample. Pyroxenization and phlogopitization of peridotite, origin of K-containing (up to 1.5 wt. % K2O) clinopyroxene, formation of $SiO_2$-rich melts normal alkalinity at $H_2O$ + $CO_2$, $H_2O$ + HCl fluid types, or elevated alkalinity melts at dry, without fluid, are closely connected with fluid composition.
The critical relations between partial silicates melt and $H_2O$ - containing fluid are observed. Intergranular silicate glass is not formed at supercritical P-T after quenching. Its absence leads to destruction of quenching samples.
The supercritical fluid-melt interacts with Ol, Opx, ± Ca-Cpx restite of peridotite to form K-containing clinopyroxene, phlogopite and carbonate. Globules of Al-Si glass during quenching are formed. Solubility of minerals peridotite, reactionary relation between relict and neogenic reactionary mineral are testified about high reactionary ability supercritical phase.
The revealed effects explain local development phase and chemical heterogeneity of the upper mantle and the mantle magmas.
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