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Experimental study of high-pressure differentiation of larnite-normative kimberlite melts

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Experimental study of phase equilibrium of larnite-normative high calcium melilitite demonstrated that merwinite occurs as liquidus phase. With the increasing pressure (up to 20 kb) melilite became unstable and instead of it merwinite ($Ca_3Mg(SiO_4)_2$) started to crystallize as result of reaction $Mg_2SiO_4+Ca_4Si_3O_{10} = Ca_3Mg(SiO_4)_2+CaMgSiO_3$. Therefore high-pressure differentiation of larnite-normative melts will result in fast depletion of residual liquid in Ca and enrichment in silica as compare to low-pressure differentiation when melilite crystallized.

Table merwinite composition

SiO_2	TiO_2	Al_2O_3	FeO	MgO	CaO	total
36.17	0.35	1.15	4.36	10.51	47.45	99.99

Key words: melilitite, phase equilibrium, montichellite

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