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**The effect of fluorine on reaction rim growth dynamics in the ternary CaO-MgO-SiO<sub>2</sub> system**

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Growth of reaction rims is mainly controlled by a change in physical parameters such as pressure and temperature, a change in the chemical composition of the system and/or by the presence of volatiles. In particular the effect of volatiles other than water on reaction rim growth remains poorly understood. Experimentally grown reaction rims in the ternary CaO-MgO-SiO<sub>2</sub> system at 1000 °C and 1.5 GPa show that the addition of fluorine has a strong effect on [I] the overall rim thickness, which increases by 10-fold if 10 wt% F is added to the dry system, [II] phase stabilities, where fluorine bearing minerals such as humite group minerals and cuspidine are stabilised, [III] the internal rim microstructure and as a consequence [IV] the relative mobilities of the individual components. This has important implications for reaction rims to be utilized as a potential “geofluidometer” and may allow us to unravel the chemical composition of metasomatic fluids.

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