Element Partitioning during rim growth in thin film geometry

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Metasomatizing Si-rich melts, originated e.g. from subducted slabs, may react with mantle rock and cause the formation of secondary orthopyroxene (*opx*). Such secondary *opx* crystals are known to conserve the signature of certain trace elements such as Ni. The question thus arises as to what degree reaction kinetics, i.e. diffusion controlled rim growth at the *opx-ol* (olivine) interface and interface kinetics affect geochemical patterns in this system.
In order to simplify the experimental setup the natural system has been reduced in our work to the well established association of forsterite (*fo*), enstatite (*en*) and quartz (*qz*). The experiments were performed under dry conditions at geologically relevant temperatures.
Both, piston cylinder experiments with doped *ol* grains embedded in *qtz* and thin film experiments, were done. A couple of thin films of *en* and *fo*, with the latter having been doped with trace elements, were deposited on a quartz substrate by pulsed laser deposition. During thermal treatment the thin film of *en* is growing in thickness due to diffusion controlled chemical reaction between *fo* and *qz*.
Our aim is to clarify the impact of parameters such as composition, pressure, water content, oxygen fugacity, etc. on the diffusion and distribution of different elemental species including both major and trace elements. These experiments can contribute to our understanding of the impact of kinetic fractionation on element distribution in metasomatized mantle rock.

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