

Lherzolite partial melting modeling for High School and University Students

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Lherzolite partial melting is the main way to obtain basaltic magmas, which are essentials in volcanism (particularly mid-oceanic ridge and hotspots). It's quit difficult for students to materialize a phenomenon, which take place at deep depths (high pressures) and temperatures, so it may be useful to propose an analogical modeling practicable by students.

The purpose of the proposed modeling is to design an artificial thin section very close to a real lherzolite with three different waxes. Each wax has different melting temperature and color. The wax with the lowest melting temperature corresponds to Clinopyroxen (Cpx), the second melting temperature to Orthopyroxen (Opx), and the highest melting temperature to Olivine (Ol).

When warming in a so-called « bain-marie », the waxes melt one after the other, in a very similar way which can be observe in real lherzolite melting. So the genesis of a basaltic magma can be highlighted associated with P/T diagram and chemical analysis of basaltic rocks, depleted peridotite and mantle lherzolite.

Another interesting point can be observed during the experiment: the beginning of melting at the grain boundaries, which is important in order to understand magmas extraction. We first did a video, which present the melting together with the evolution in a triangular diagram Ol-Opx-Cpx and another one associated with P/T diagram.

Then we wanted students to observe the melting by themselves, but as the modeling of the artificial thin section take a long time for the laboratory staff (They must cut the different waxes for each student group). We're working on designing a pattern to allow students pour waxes themselves easily before observation

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