



University of Genova

Department of Earth, Environmental
and Life Sciences

Doctorate Course in Earth and
Environmental Science and
Technology

Università degli Studi di Genova



Dottorato in Scienze e Tecnologie
per l'Ambiente e il Territorio

Earth Science Curriculum

Research Theme n. 1

<p>Titolo: Processi di percolazione reattiva ed impregnazione di fusi nelle peridotiti di mantello dell'Oman (Ophiolite Samail): vincoli petrologici e strutturali. Title: Reactive melt percolation and impregnation in the Oman mantle peridotites (Samail Ophiolite): petrological and structural constraints.</p>
<p>Tutors: Elisabetta Rampone (elisabetta.rampone@unige.it) Laura Crispini (laura.crispini@unige.it)</p>
<p>Program description including the formation program abroad Integrated studies of abyssal and ophiolitic peridotites have provided crucial details on the formation and evolution of the oceanic lithosphere, pointing that the compositional variability of the oceanic mantle is largely caused by multistage melt-rock reactions occurred at different depths (e.g. Rampone et al., 2020). This PhD project aims at exploring the processes of reactive melt percolation and impregnation in the uppermost oceanic mantle by combined structural and petrological/geochemical studies on the Oman peridotites (Samail Ophiolite), one of the best fossil analogues of modern oceanic seafloor. Although the Samail mantle section constitutes one of the most famous examples of impregnated oceanic mantle, thorough studies devoted to the origin of the plagioclase-impregnated peridotites and their significance in the context of the complex geodynamic evolution of the Oman ophiolites, are not available. The project will concern field-based combined microstructural (e.g. EBSD, TEM) and in-situ mineral geochemical investigations (e.g. EPMA, laser ablation ICP-MS and ion microprobe) on available samples from OmanDP cores and new field-collected samples of peridotites and impregnation-related troctolites. Major aims of the research will be: i) to unravel the microstructural and chemical changes induced by melt impregnation in the uppermost oceanic mantle, ii) to track the origin and chemical evolution of impregnating melts. The PhD trainee will have the opportunity to developed the research program in the frame of established collaborations with Géosciences Montpellier (Université de Montpellier, France), Géosciences Environnement Toulouse (CNRS_ Université Fédérale de Toulouse, France), University of Lorraine, CNRS, CRPG (Nancy, France), University of Milano (Italy), University of Pavia (Italy).</p>
<p>Financial support: DISTAV - UniGe grants</p>
<p>Tutor's publications (max 3): Basch V., Drury M.R., Plumper O., Hellebrand E., Crispini L., Barou F., Godard M., Rampone E. (2021). Intracrystalline melt migration in deformed olivine revealed by trace element compositions and polyphase solid inclusions. <i>European Journal of Mineralogy</i>, 33, 463–477, doi:10.5194/ejm-33-463-2021. Rampone E., Borghini G., Basch V. (2020) - Melt migration and melt-rock reaction in the Alpine-Apennine peridotites: Insights on mantle dynamics in extending lithosphere. <i>Geoscience Frontiers</i> 11, 151-166, doi.org/10.1016/j.gsf.2018.11.001. Basch V., Rampone E., Crispini L., Ferrando C., Ildefonse B., Godard M. (2019). Multi-stage reactive formation of troctolites in slow-spreading oceanic lithosphere (Erro-Tobbio, Italy): a combined field and petrochemical study. <i>Journal of Petrology</i>, vol. 60 (5), p. 873-906, ISSN: 0022-3530, doi: 10.1093/petrology/egz019.</p>