Effect of oxygen fugacity on partitioning of metal elements between sulfides and ultramafic melts: Experimental approach

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Oxygen fugacity is an important parameter controlling the concentration of metal elements present in mafic to ultramafic magmas. It plays a fundamental role in the partitioning of several economically important elements (e.g. Pt, Ni, Cu) between sulfides and silicate melts. Although the partition coefficients of these elements have been experimentally investigated by several authors, and oxygen fugacity appears to severely affect their variations [e.g. 1, 2], a precise and comprehensive determination of this effect is still missing. Moreover, the range of oxygen fugacities relevant to magmatic intrusions is probably larger than previously believed, as recent works [3 and abstract Iacono-Marziano et al. in this session] show how the interaction with sedimentary rocks can sensibly affect the redox conditions of the magma.

We are performing high pressure high temperature experiments in internally heated pressure vessels using a picrite from Noril'sk 1 intrusion as starting material. The use of Pt capsules allows to increase the Pt content of the melt. Ni, Cu, Pt and Au contents in sulfide droplets and coexisting melts are measured by laser ablation inductively coupled plasma mass spectrometry, while their major element compositions are analyzed by electron microprobe. We present and discuss preliminary results obtained at different oxygen fugacities.

[1]Gaetani & Grove (1997), *Geochimica et Cosmochimica Acta* **61**, 1829-1846 [2]Mungall & Brenan (2014), *Geochimica et Cosmochimica Acta* **125**, 265-289 [3]Iacono-Marziano, Gaillard, Scaillet, Polozov, Marecal, Pirre, Arndt (2012b), *Earth and Planetary Science Letters* 357-358, 319-326