

Celadonite, one efficient transporter of K and water into the mantle.

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The presence of K- rich and hydrated phases in the upper mantle requires recycling of chemical elements in the Earth. One of the mechanisms responsible for this is the subduction of altered oceanic crust [1,2], in which celadonite crystallize among several other minerals. Celadonite is a dioctahedral K-rich, ferrous clay mineral. We tested celadonite stability under high pressures and high temperatures to evaluate its effective capacity to transport K in subduction zones into the mantle. In our starting material, there is always a minor amount of saponite and pyrites. Therefore, we worked with celadonite, saponite and pyrite assemblage in order to make our research more related to a realistic scenario. The experiments were carried out at pressures from 1atm to 7.7Gpa and temperatures from 200 to 900°C. The run product mineral structures is observed with X-Ray diffraction, while the hydroxyl behavior is observed with Fourier-transform infrared spectroscopy. Scanning electron microscopy is used to observe the morphology of samples and Mössbauer spectroscopy to observe the Fe valence in the minerals. In reductive environment and pressures up to 2.5Gpa, celadonite is stable up to 500°C and above these temperatures it changes to trioctahedral phyllosilicate together with pyrrhotite and quartz formation. In 4GPa and 7.7GPa trioctahedral phyllosilicate, coesite and enstatite are formed up to 700°C.

This trioctahedral phyllosilicate (Phlogopite-Annite) phase is hydrated, K-rich and must be an important conveyor of K and water into the mantle metasomatism. Celadonite alteration is an important product from hydrosphere and lithosphere interaction and this interaction and celadonite recycling must impact the geochemical evolution of the Earth.

- [1]Conceição & Green (2004) *Lithos* 72 209– 229
[2]Burkhard *et al* (2005), *Chemical Geology* 218, 281-313.