The 512th Geodynamics Seminar

In situ experimental study of eclogite – COH system at the upper mantle conditions

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Subducted oceanic plates are likely to constitute the major source of compositional heterogeneities in the Earth's mantle. Volatile components, carried by the sediments and altered basalts, control melting relationships in the subducting plate and in the overlying mantle wedge and have considerable effect on seismic observables and measured electrical conductivity (e.g., Karato, 1995; Wiens and Smith, 2003; Yoshino et al., 2006). Experimental data on fluid and rock interaction can provide essential information for interpretation and prediction of these properties along the pressure and temperature profiles of subducting plates.

In the previous high-pressure studies on basalt (eclogite) – C-O-H systems (e.g., Hammouda, 2003; Poli et al., 2009; Litasov et al., 2014) mainly quenching techniques were used and the recovered samples were investigated at ambient conditions. Nevertheless, C-O-H components can easily undergo phase transformations and lose volatiles upon quenching and opening of the experimental cell (e.g., Murli and Song, 2010; Zheng et al., 2016; Chertkova et al., 2018). In this work, we employed *in situ* spectroscopic methods in combination with the diamond anvil cell technique in order to study eclogite–5.75H_2O–CH_4 system directly at experimental conditions up to 1000 °C and 5 GPa. During this presentation I will describe our development of the new cell assembly with a large optical access to the sample for *in situ* infrared, Raman and X-ray diffraction measurements and will show our recent results, revealing C-O-H fluid behavior at these pressure and temperature conditions and its influence on phase relationships.

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