Neutron diffraction on methane and hydrogen hydrates under high pressure

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MS42-P1 Neutron diffraction on methane and hydrogen hydrates under high pressure

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Gas hydrates are crystalline solids composed of water and gas. They have attracted considerable attention over the past decade both for their geophysical relevancy [1] and for their possible application to gas storage [2]. Pressure is a key parameter in the study of these systems as gas hydrates are believed to exist at pressure in nature and the gas content is found to increase in gas hydrates as their crystalline structure rearranges upon compression. In addition, high-pressure studies on gas hydrates offer new possibilities to explore water-gas interactions.

We will present recent work on methane and hydrogen hydrates at high pressure performed by neutron diffraction in the GPa range [3]. Several issues including the gas content in the different high-pressure structures will be discussed.

[1] J. S. Loveday and R. J. Nelmes, Phys. Chem. Chem. Phys. 2008 10, 937–950.

[2] V. V. Struzhkin et al., Chem. Rev. 2007, 107, 4133-4151.

[3] U. Ranieri et al. in preparation.

Keywords: neutron diffraction, high-pressure, gas hydrates

MS42-P2 FALCON - A Laue diffractometer for ambient and non-ambient neutron structural analysis

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End of 2015 the FALCON Laue diffractometer at the Berlin neutron source BERII started. It was developed in collaboration with the ILL, Grenoble. The diffractometer is designed for fast neutron data acquisition of single crystals and makes use of a white (“pink”) neutron beam with wavelength band of 0.8-3.2 A. Pattern acquisition is performed by means of a backscattering and a transmission detector consisting of four iCDD cameras each. The detectors cover an activ area of 400x400 mm^2. Acquisition time depending on sample is about half up to three minutes. The sample is mounted on an irelec cradle allowing sample positioning and orienting. A chamber for sample cooling is in progress and will open up the possibility for Laue data acquisition down to temperatures of about 60K. The instrument set-up as well as some worked examples will be shown in detail.

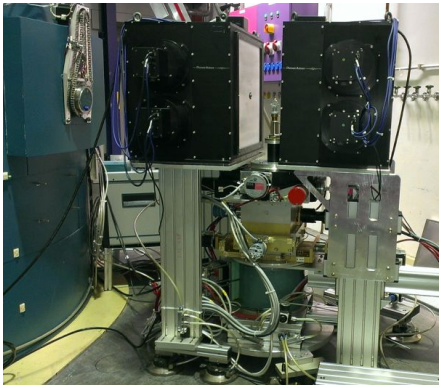

Figure 1. FALCON - Fast Acquisition Laue Camera for Neutrons

Keywords: Neutron diffraction, Laue technique