# Experimental Report



**Proposal:** **6-02-482** **Council:** 4/2011

**Title:** Dynamics of water confined in novel periodic mesoporous organosilica

**This proposal is a new proposal**

**Researh Area:** Physics

**Main proposer:** **BELLISSENT-FUNEL Marie-Claire**

**Experimental Team:** YAMAGUCHI Toshio
BELLISSENT-FUNEL Marie-Claire
YOSHIDA Koji

**Local Contact:** FOUQUET Peter

**Samples:** Silica with phenol/SiO2-C6H6, silica with phenol and tetramethylsilane/SiO2-C6H6-(CH3)4Si, and heavy water/D2O

| Instrument | Req. Days | All. Days | From | To |
|---|---|---|---|---|
| IN11 | 8 | 7 | 24/10/2012 | 31/10/2012 |

**Abstract:**

The proposed experiment aims to investigate the slow dynamic motion of capillary condensed heavy water molecules confined in two PMO materials in the supercooled state on IN11 by neutron spin-echo spectroscopy. The two PMO used are Ph-PMO with a framework of phenol groups embedded in silica matrix (pore size ~2.7 nm) and TMS-Ph-PMO (~2.7 nm) in which some of the silanol groups in Ph-PMO are modified with tetramethylsilane (TMS) to increase the hydrophobic nature of the pore surface. The data will be analyzed to obtain the intermediate scattering function I(Q,t) that gives the correlation time of water molecules and the translational diffusion constants. The results obtained will be compared with previous ones on water confined in MCM-41 C14 (2.8 nm). These results give us important information about the dynamics of water confined in the well-defined pore space and, in particular, the effect of the hydrophilic-hydrophobic nature of the pore surfaces on the dynamic properties of water in confinement. The present outcome would provide useful information in various application fields, such as conservation of foods at low temperatures, usage of fuel cell under cold climate condition etc

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