NMI3-FP7-JRA-II

**WP20 “Advanced neutron tools for Soft and Bio-Materials”**

**Report of meeting from December 6-7 , 2012 at Garching A. Brûlet**

**List of attendees.** A. Church, O. Kirichek, B. Evans, R. Down, *A. Hughes*, S. Cox, B. Eltham (ISIS) - A. Brûlet, A. Hélary, S. Combet (LLB)- E. Lelievre, G. Fragneto, Y. Gerelli (ILL) - H. Freilinghaus, T. Schrader (JCNS) - J. Peters, H. Kolb , H. Weiß (FRMII) - K. Kiefer, M. Barrett , D. Wallacher (HZB)

**Resume**

 **Afternoon December 6th:**

* Discussion about the Task 3 (cryogen free cryostat) leader: FRMII has made a lot of progress in the design of a new and very compact cryostat with a robot to change the samples kept at room temperature. After a discussion with E. Lelièvre (ILL), the task 3 leader will be FRMII and not ILL as written in the initial project.
* Meeting of the WP: Except a meeting organized by HZB on Task 3, “Humidity Chamber”, no other meeting was held in 2012. Partners find that it is not enough obviously. A minimum per year of one meeting per task and one general meeting (of all tasks) will be organized in the next years.

**Good dinner at the Neuwirt Gaststätte in Garching offered by JCNS.**

**December7th:**

* Task 3 “ Humidity Chamber”; M. Barret (HZB) who is developing a humidity chamber for his PhD thesis subject (study of cholesterol solubility in DMPC membranes, and stalk formation in membranes) and H. Freilinghaus (JCNS) who recently bought a modified Anton Park device for SANS have presented the existing devices, their advantages and defaults. Objectives and key points for a future humidity chamber have been identified.
* Task 2 “Kinetics and Dynamics “ \_Sub task “Pressure cell”; H. Freilinghaus (JCNS) has shown the different setups used at JCNS and also at PSI, which allow to rich 6-7 kbar more or less easily, required to denature proteins. For NSE, only a low pressure, about 500bar, has been reached. This is not enough to study the dynamics of proteins denaturated by pressure. An idea of multi-cylindrical cells into a sapphire block has been presented.

S. Combet (LLB) presented a SANS study of metallic materials which could be used as pressure cell windows to replace fragile sapphire windows. Using appropriate data treatment, we can get rid of the extra scattering by thick (up to 12 even 24mm) metallic windows and still recover the signal of the sample alone. The limiting factor is the transmission of the cell windows, which depends on the alloy chosen and on its thickness.

Many remarks seemed to indicate that high pressure of 7kbar already existed (Sadikov…). The situation is not so clear from the users point of view. The accuracy of the measurement of the pressure (+-100 bars) even at low value around 2kbar seems to be a problem. Form discussions, it appeared that the goals of this sub-task are still not well-defined. A survey of existing setups is necessary. Solutions for soft matter new devices should come from this survey.

* Task 4 “Cryogen free cryostat”; A very compact design of a cryogen free cryostat was presented by Jürgen Peters (FRMII). Next step will consist in web-conferencing between ILL and FRMII to discuss and work on the actual drawings of FRMII. (ftp://ftp.frm2.tum.de/pub/hkolb/PDF)
* Task 1 “ Platform for biomembranes”; G. Fragneto (ILL) presented the objectives of the task, the current status of the deuterated lipids extraction, membrane reconstitution … Y. Gerelli (ILL) (PDRA since the start of the grant) showed experimental results obtained at ILL. Next year, a technician will be hire to work on lipid extraction. A ILL PhD student (collaboration with CEA and Univ. Milan) is starting to work on natural membrane and lipid extraction. of ILL
* Task 2 “Kinetics and Dynamics “ \_Sub task “LS& SANS”; T. Schrader (JCNS) presented a proposal of design of a multi-angle light scattering setup for SANS.
* Task 2 “Kinetics and Dynamics “\_Sub task “Electric field cell”; A. Hélary (LLB) presented a prototype of electric field cell for SANS, with electrodes outside the cell and not inside as for most of past published experiments. Transverse and longitudinal horizontal geometries of applied electric field have been envisaged.

All the presentations will be put on the NMI3 web site. Possible meeting (general meeting or task meeting ) at the ICNS conference in Edinburgh has been mentioned. Meeting of Task 2 at LLB is wished at the beginning of 2013.