Agenda Berlin, 22.10.2012

NMI3-FP7-JRA-II-WP20 “Advanced neutron tools for Soft and Bio-Materials”

Task 3 “Humidity Chamber” (room LS 206)

9:00	Welcome (K. Kiefer)
9:05	Collection of existing humidity chamber applications developments in neutron science (D. Wallacher) - research under controlled humidity at HZB (T. Hauß) - humidity chamber applications at ILL (Y. Gerelli, B. Demé) - humidity cell of KWS2-SANS at FRM-II (N. Szekely JCNS) - available and planned equipment at ILL (E. Lelièvre-Berna) - general overview of existing equipment and applied methods (M. Barrett)
10:30	*Coffee break*
10:45	Discussion (D. Wallacher) specifications (“wish list”) of the next-generation humidity chambers task-affairs: organization of collaboration, meetings, coordination etc.
12:00	Lunch in HZB canteen
Afternoon	Visit of HZB-labs (Bio, Gas, Neutron) and further discussion (K. Kiefer M. Barrett, T. Hauß)

Agenda Berlin, 22.10.2012

NMI3-FP7-JRA-I-WP21 “Sample Environment” (room LS 206)

13:00	Welcome (D. Wallacher)
13:05	Overview of task progresses and final status - high-pressure task (O. Kirichek) - levitation furnace task (E. Lelièvre-Berna) - gas adsorption task (D. Wallacher)
14:30	*Coffee break*
14:45	Miscellaneous (Z. Bowden) - Where do we go from here? How we should share the knowledge/equipment that we have gained. - Preparation of report and final GA-meeting in Garching at 6th December - Outlook and discussion of new Sample Environment JRA topics in the FP8-programm.
17:00	official closing of the meeting

Evening optional dinner

WP20 Advanced Neutron Tools for Soft and Bio Materials

Task 3. Humidity chamber

- Description of work
- Deliverables
- Specifications
- Contributions
- Reports, Meetings, …

Task 3. Humidity chamber
Description of Work

HZB (task leader)- ILL, JÜLICH (partners)- STFC, TUM, CEA, McMaster Univ. (Canada) (observers)

In-situ control of the hydration level of soft materials samples plays a crucial role in the investigations of a number of systems like for example the proton motion in Nafion membrane, the dynamics of phospholipid membranes, the structure and dynamics of clays, as well as in the study of the function/structure relationship of proteins. In the last years, ILL and HZB have been developing humidity chambers for neutron scattering using different techniques to control both relative humidity and temperature. But further developments are needed to obtain a faster and better controlled response in wider temperature and humidity ranges. Different geometries of humidity chambers with different specifications will be produced to adapt to SANS, reflectometry, spin-echo, and other inelastic measurements. Multi-position sample holder for SANS with controlled temperature stability across the sample holder will be also designed.

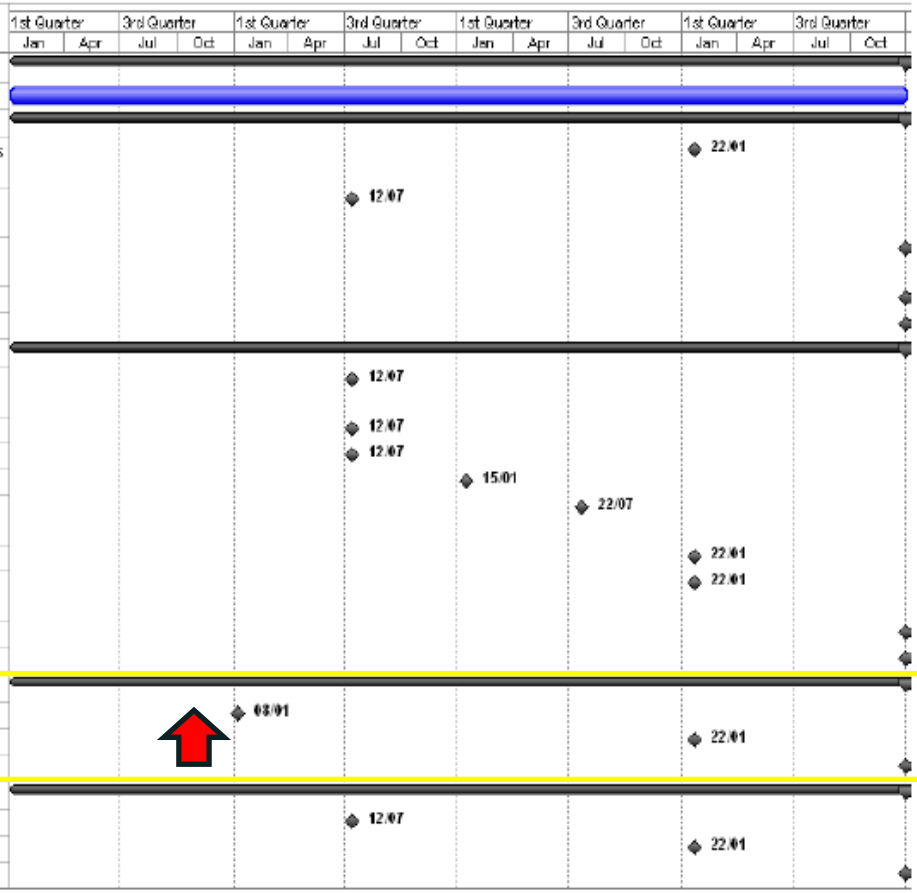
Task 3. Humidity chamber Deliverables

During the first year we will review the existing systems and determine the specifications of the next-generation humidity chambers with the goal of 10mK temperature stability and 0.1% humidity control over ranges to be discussed. This chamber will also be non-magnetic for being compatible with spin-echo spectrometers and other polarised neutron instruments. The drawings will be produced during the second year and the chamber will be built and commissioned in the third year.

Task 20.3	Humidity chamber	HZB*,ILL,JÜLICH	1	48	
M 20.3.1	Specifications of the next-generation humidity chambers	HZB, ILL	1	12	
M 20.3.2	Drawings and procurement of components for humidity chambers	HZB, ILL	12	36	
D 20.3.1	Assembly of the humidity chamber. Tests	HZB, ILL,JÜLICH	36	48	Report

WP20 Advanced Neutron Tools for Soft- and Bio-Materials

ID	task	Deliverable/ Milestone	Task Name
1	**WP20**		**Advanced Neutron Tools for Soft- and Bio-Materials**
2	**Task 20.0**		**JRA management activity**
3	**Task 20.1**		**A platform for model biological membranes**
4		M 20.1.1	Optimization of model bilayer systems including natural membrane lipids
5		M 20.1.2	Set up a lipid extraction facility to extract and fractionate membranes from real cells
6		D 20.1.3	Tests and methodologies to perform NR, GISANS and spin echo measurements on membranes
7		D 20.1.4	Protocols for reliable reconstitution of membrane proteins
8		D 20.1.5	D lipids extraction. Modeling of biomembranes
9	**Task 20.2**		**Kinetic/dynamic measurements in periodic external fields**
10		M 20.2.1	Designs of new stop flow observation heads for SANS and reflectometry
11		M 20.2.2	Conception and design of MA-LS setup
12		M 20.2.3	Design an electric field cell for SANS
13		D 20.2.1	Tests of MA-LS setup
14		D 20.2.2	Tests of new stop flow observation heads for SANS. Drawings of SF cell for reflectometry.
15		M 20.2.4	Conception and design of a pressure cell for NSE
16		M 20.2.5	Procurement of components of the EF for SANS. Specifications and drawings for TOF and NSE
17		D 20.2.3	Prototype of pressure cell for NSE. Tests
18		D 20.2.4	Prototype of EF for SANS. Tests
19	**Task 20.3**		**Humidity chamber**
20		M 20.3.1	Specifications of the next-generation humidity chambers
21		M 20.3.2	Drawings and procurement of components for humidity chambers
22		D 20.3.1	Assembly of the humidity chamber. Tests
23	**Task 20.4**		**Cryogen-free cryostat with sample changer**
24		M 20.4.1	Design and simulations of cryostat with sample changer
25		M 20.4.2	Drawings and components procurement
26		D 20.4.1	Tests of cryostat. Designs of cryostat tails for different spectrometers



Task 3. Humidity chamber Specifications

- 10mK temperature stability and 0.1% humidity
- Non-magnetic
- Different geometries (Diffraction, SANS, Reflectometry, …)
- Sample changer (SANS)

Task 3. Humidity chamber Contributions

	ILL	STFC	HZB	FRMII	JCNS	LLB
Sub Total Task 3	7 (2+3+2)		20 (6+6+7)		4 (1+1+2)	

- Who is doing what?
- How do we communicate?

Task 3. Humidity chamber
Reports and Meetings

- Annual (milestone) report ?
- NMI3 Meeting – 6th December in Garching ?

Humidity Control by Saturated Salt Solutions

Saturated Salt Solution	Relative Humidity (%) at 20°C
P2O5 (Phosphorpentaoxid)	**0.00**
LiCl (Lithiumchlorid)	**11.31**
C2H3KO2 (Kaliumacetat)	**23.11**
MgCl (Magnesiumchlorid)	**33.07**
K2CO3 (Kaliumcarbonat)	**43.16**
NaBr (Natriumbromid)	**58.00**
NaCl (Natriumchlorid)	**75.47**
KCl (Kaliumchlorid)	**85.11**
K2S04 (Kaliumsulfat)	**97.59**
H20 (Wasser)	**100.00**
K2S04 (Kaliumsulfat)	**97.59**
KCl (Kaliumchlorid)	**85.11**
NaCl (Natriumchlorid)	**75.47**
NaBr (Natriumbromid)	**58.00**
K2CO3 (Kaliumcarbonat)	**43.16**
MgCl (Magnesiumchlorid)	**33.07**
C2H3KO2 (Kaliumacetat)	**23.11**
LiCl (Lithiumchlorid)	**11.31**
P2O5 (Phosphorpentaoxid)	**0.00**