Contribution ID: **13** Type: **not specified**

Simultaneous SANS/FTIR to investigate the conformation of polyethylene glycol dimethyl ethers inside a co-crystalline matrix of syndiotactic polystyrene

Wednesday, 21 June 2017 10:30 (15 minutes)

The development of combined techniques for measuring of the samples is generally desirable, because it allows following two or even more physical parameters on the same sample at the same time. In this regard, complementary time-resolved in-situ Fourier-transform infrared spectroscopy (FTIR) applied to small-angle neutron scattering (SANS) is useful for the investigation of structural changes in samples of interest, especially for monitoring the sample condition during the SANS study and for getting complementary structural information. Using this simultaneous measurement method (SANS/FTIR), we have recently investigated the distribution and the conformation of guest molecules (small oligomers, polyethylene glycol dimethyl ethers) inside the co-crystals of syndiotactic polystyrene when varying the temperature. In particular, we found that at low temperature close to the ambient one the guest molecules are distributed in both the crystalline and amorphous regions, while they are predominantly included in the amorphous region in the high-temperature case. Moreover, the 2-D SANS profiles and the FTIR spectra suggest that the small oligomers stored in the crystalline region adopt a stretched form perpendicular to the lamellae plane, while the oligomers residing in the amorphous region form agglomerates with a dense core and loose arms. In the last part of the contribution, the newly developed optical system will be presented together with the new variable temperature cell holder, that allowed to extend the IR measurement system combined with the SANS experiment to different kinds of specimen.

Primary author: Dr SCHIAVONE, Maria Maddalena (Jülich Centre for Neutron Science - Outstation at MLZ)

Co-authors: Dr RADULESCU, Aurel (Jülich Centre for Neutron Science - Outstation at MLZ); Prof. KANEKO, Fumitoshi (Graduate School of Engineering, Osaka University); Dr ALLGAIER, Juergen (JCNS-1/ICS-1, Forschungszentrum Juelich); Prof. UTE, Koichi (Department of Chemical Science and Technology, University of Tokoshima); Dr SETO, Naoki (Graduate School of Engineering, Osaka University); Dr SATO, Shuma (Graduate School of Engineering, Osaka University); Dr SCHRADER, Tobias (Jülich Centre for Neutron Science - Outstation at MLZ)

Presenter: Dr SCHIAVONE, Maria Maddalena (Jülich Centre for Neutron Science - Outstation at MLZ)

Session Classification: Parallel Session