ESRF	**Experiment title:** **Exploring structural changes in Protic Ionic Liquids mixtures upon the co-solvent polarity**	**Experiment number:** SC-4272
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Shifts: 6	**Local contact(s):** Rajeev Dattani	

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Report:

The proposed experiment was focused on characterising the mesoscopic organization in binary mixtures of protic ionic liquids (PILs) and molecular liquids (ML) chosen upon their polarity and functional groups. The well known mesoscopical organization of PILs may undergo to deep changes upon mixing with a molecular compound. In particular, often the so called Low q Peak is shifted according to where the co-solute is hosted. This concept has recently been widened by the observation that ethylammonium nitrate (EAN) in mixture with n-alcohols give rise to an highly heterogeneous organization, such that its fingerprint can be find in a Q region typical of the protein size. By now the interpretation of this feature concerns self assembled structures. During our experiment we were able to study a series of different mixtures. In particular, two sets were extremely interesting, namely EAN+1,4-diaminobutane and EAN+1,2-dimetoxyethane. Both of the molecular liquids are symmetrical (i.e. not amphiphilic) and thus could not self assemble, confuting the self-assembly hypothesis. This study took advantage of the unique performances of ID02 in terms of access to USAXS Q range, otherwise such a results would be impossible to achieve. The collected results however are still limited, but prove the assumption of the divergence of critical fluctuations. We also find the same feature in much more mixtures than one may expect, thus suggesting that this behaviour is general and common for this kind of material. Shamefully the limited time didn't allow us to fully characterize every set of systems, but we have collected truly important results for the scientific community. These results could be very useful in catalysis and in electrochemistry. These results are just accepted on Journal of Physical Chemistry B. Other interesting results from our session are currently being analysed.

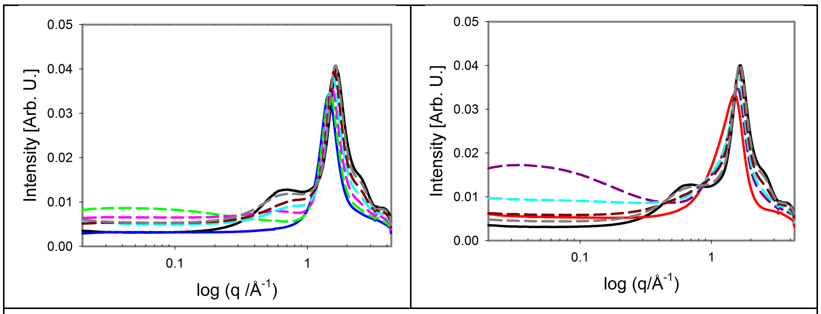

Figure 1. Left: EAN+1,4-diaminobutane. Right: EAN+1,2-dimetoxyethane