Polymers under Multiple Constraints

Polymer- & Soft-Matter-Seminar

Tuesday, 21st January 2014

at: 5.15 pm

VSP1 1.26, Von-Seckendorff-Platz 1, 06120 Halle

Prof. Dimitri Ivanov

Université de Haute-Alsace, Mulhouse, France

"From Channel-Forming Ionic Liquid Crystals to Nanostructured Ion-Conducting Polymer Membranes"

Designing the topology of the fluid phase in nanostructured liquids is a key factor for a variety of practical applications ranging from drug delivery to membrane technology. Supramolecular assembly of low-molecular-weight compounds is a convenient tool to generate a diversity of structures that can be suitable for creating ion-selective membranes.
A novel wedge-shaped amphiphilic molecule bearing a sulfonate group at the tip is found to exhibit humidity-induced phase transitions from hexagonal columnar structure to bicontinuous cubic phases [1]. The mesophases can be arrested by photo-polymerization of acrylic end-groups resulting in free-standing membranes with different topology of ionic nano-channels (Fig. 1). The obtained membranes with well-ordered ionic-channel structure hold promise for applications in separation and catalysis.

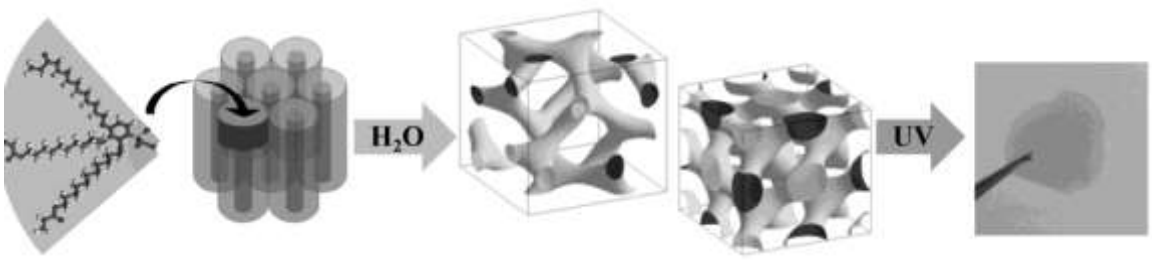

Figure 1. Bottom-up approach for design of new ion-selective membranes.

Dimitri A. Ivanov[a], Jaime J. Hernandez Rueda[a], Martin Rosenthal[b], Denis V. Anokhin[b], Heng Zhang[c], Lei Li[c], Xiaomin Zhu[c], Martin Moeller[c], Mark Lingwood[d], Louis A. Madsen[d]
[a]IS2M, 15 rue Jean Starcky, B.P. 2488, F-68057 Mulhouse Cedex, France
[b]Moscow State University, Faculty of Fundamental Physical and Chemical Engineering, GSP-1, 1-51 Leninskie Gory, Moscow,119991, Russian Federation
[c]DWI an der RWTH Aachen e.V. and ITMC of RWTH Aachen University, Forckenbeckstr. 50, D-52056 Aachen, Germany
[d]Department of Chemistry and Macromolecules and Interfaces Institute,Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061, USA
Email of corresponding author:dimitri.ivanov@uha.fr