MM1: Polymers and neutrons JMC15

***SELF-ORGANIZATION OF CATIONIC PH- AND THERMO-RESPONSIVE COPOLYMERS***

*E. Deniau-Lejeune1, M. Rabyk2, L. Billon1, O. Borisov1, M. Hruby2, P. Stepanek2*

*1 Institut des Sciences Analytiques et de Physico-Chimie pour l’Environnement et Materiaux, Universite Pau et Pays de l’Adour, France*

*2 Institute of Macromolecular Chemistry, Academy of Sciences of the Czech Republic, Czech Republic*

The goal of the present work is to show that novel type of multi-responsive cationic block-gradient copolymers can exhibit reversible pH- and temperature-controlled association in aqueous media. leading to diverse nano-aggregates.

The dimensions and the morphology of the aggregates can be affected by external stimuli, such as temperature, ionic strength and pH provided that the copolymers comprise ionic pH-sensitive or/and thermo-sensitive monomer units. Such properties of the copolymer nano-assemblies make them attractive for multiple applications ranging from nano-electronics to nano-medicine.

A SANS study has permitted to investigate the structural properties of supra-molecular assemblies formed in aqueous solutions of cationic pH- and thermo-sensitive block-gradient copolymers comprising one block of poly(dimethylaminoethyl acrylate) P(DMAEA) and one or two terminal blocks with a gradient sequence of styrene and DMAEA monomer units. We will show that because of the gradient sequence of the terminal blocks such copolymers are capable of reversible association giving rise to micellar-like aggregates in aqueous solutions as a function of both pH and temperature. Particularly we have used contrast matching to study the kinetics of the dynamic association of mixed micelles composed of deuteriated styrene and hydrogenated styrene.

1. Borisova O.V., Billon L., Zaremski M., Grassl B., Bakaeva Z., Lapp A., Stepanek P., Borisov O.V. Soft Matter, 2011, 7(22), 10824-10833 ; Soft Matter, 2012, 8, 7649-7659

2. Deniau-Lejeune E., Drechsler, M., Jestin, J., Müller A.H.E., Chassenieux C., Colombani O. Macromolecules 2010, 43, 2667-2671.

1