3P_10

POLYSOLVAT-13, 13th International IUPAC Conference on Polymer-Solvent Complexes & Intercalates
9-12 November, Osaka, Japan

Complexation of polymers with terpyridine/ferrocene side units due to interaction with metal ions

I. PEREVYAZKO[a] , A. LEZOV[a] , A. GUBAREV[a] , N. MIKUSHEVA[a], N. TSVETKOV[a] , U.S. SCHUBERT[b,c]

[a]Department of Molecular Biophysics and Polymer Physics, St. Petersburg State University, Universitetskaya emb., 7/9, St. Petersburg, 199034, Russian Federation
[b]Laboratory of Organic and Macromolecular Chemistry (IOMC), Friedrich Schiller University Jena, Humboldtstr. 10, Jena, 07743, Germany
[c]Jena Center for Soft Matter (JCSM), Friedrich Schiller University Jena, Philosophenweg 7, Jena, 07743, Germany
n.mikusheva@spbu.ru

Polymers containing metal ions are of significant importance regarding, for instance, (photo)catalytic, optoelectronic, nanotechnological, or biomedical applications. A promising approach in this field is the conjunction of covalent linked polymer species with non-covalent (electrostatic) interactions to establish new polymeric systems. However, in-depth investigations correlating their performance to their molecular and conformational structure have not yet been made. The focus of interest of present research are polymers combining two different types of metal centers in the side chains: (i) metal-terpyridine, (ii) metallocenes complexes. The non-metal polymers serve as structural references throughout the further conformational analysis of the metal-containing copolymers to make a fundamental understanding of the contribution of the various structural parameters of the metallopolymers (nature of the metal center, presence of charges, counterions, etc.) to their solution properties possible.

A set of samples of copolymers with terpyridine/ferrocene units in the side chains (**Fig. 1**) were synthesized by RAFT polymerization. In order to form metal-containing complexes the macromolecules were treated with metal ions (in particular, Eu^{3+}) by adding corresponding salt solution to the solution of polymer. The hydrodynamic characterization is provided in dilute solutions by analytical ultracentrifugation, dynamic light scattering (DLS), density and intrinsic viscosity measurements. The coherence of obtained results is confirmed using the concept of hydrodynamic invariant. In the next step, the complexation was additionally studied by SEM and AFM methods.

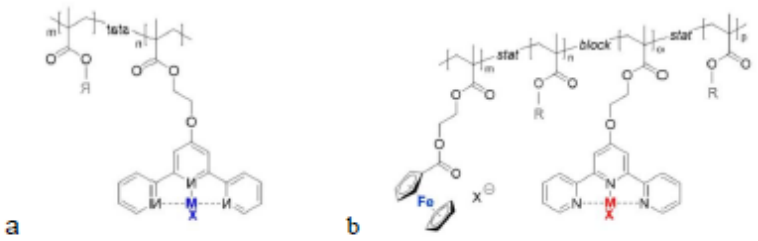

Fig. 1. Chemical structures of (co)polymers with terpyridine (a) or terpyridine and ferrocene (b) units in the side chains. R = $(CH_2CH_2)_30CH_3$ or CH_3

Acknowledgments. The reported study was funded by RFBR and DFG, project number 21-53-12034. The authors are grateful to the St. Petersburg State University Research Park for providing of some necessary scientific equipment.