Abstract

The diploma thesis presents the preparation of α,ω-bisterpyridinylfluorenes (unimers) containing fluorene unit in the central block either directly attached to terpyridine (*tpy*) end groups or *via* 1,4-phenylene or thiophene-2,5-diyl linker. Synthesized unimers were subsequently used for the preparation of metallo-supramolecular polymers with Zn^{2+} and Fe^{2+} ions.

The prepared unimers were characterized by NMR, IR and HR-MS, their optical properties were investigated using absorption and emission spectroscopy and cyclic voltammetry. Molecular weight distribution for the prepared Fe-polymers was determined by GPC. The number-average degree of polymerization equal to 7 for an equimolar ratio between unimer and Fe^{2+} in a diluted solution was determined for polymers composed of unimer with thiophene-2,5-diyl linker. By using the viscometric measurements the ongoing constitutional dynamics in solutions of metallo-supramolecular polymers was proven. The overstoichiometric amount of metal ions in solution resulted in equilibrium shortening of the polymer chains together with end-capping of terminal *tpy* ligands by Mt^{2+} ions.

Unimer with thiophene-2,5-diyl linker exhibited unique properties involving significantly red-shifted absorption and emission maxima, as well as the different behavior during assembling with metal ions in comparison with other two unimers and related polymers. While the other unimers show similar absorption and emission characteristics and formation of longer chains is preferred during assembling with Fe^{2+} ions, in the assembling process of unimer with thiophene-2,5-diyl linker one can distinguished dimeric, trimeric and longer oligomeric species by GPC combined with DAD detector. Viscometric and GPC measurements additionally showed that this unimer form the shortest oligomeric/polymeric chains with both used metal ions of all studied systems.

Key words

terpyridine, fluorene, Suzuki-Miyaura cross-coupling, metallo-supramolecular polymer, UV-vis, fluorescence, CV, GPC.