

# Synthesis and Characterization of Higher Order Structure of Wholly Aromatic Block Co-oligomers: Oligo(ether sulfone)-*b*-Oligo(ether ketone) s

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[Introduction] Block molecules such as block co-oligomers or copolymers are well-known self-assembling materials that offer intriguing tunable built-in nanoscopic domains and tailored surface or bulk properties<sup>1</sup>. A variety of coil-coil type<sup>2</sup> and rod-coil type block molecules<sup>3</sup> have been widely studied and found to exhibit various microphase-separated nanostructures such as spheres, cylinders, lamellae and unique supramolecular structures. Very few attempts, however, have been made at study of wholly aromatic rigid-rod block molecules, namely, rod-rod type block molecules. Herein, we report synthesis and self-assembly of wholly aromatic oligo(ether sulfone) (OES) and oligo(ether ketone) (OEK) di- and triblock co-oligomers (OES-*b*-OEK)s (Fig. 1).

[Experiment, results and discussion] The well-defined di- and triblock OES-*b*-OEKs were synthesized by a stepwise aromatic nucleophilic substitution and deprotection reactions. The chemical structures of di- and triblock OES-*b*-OEKs were characterized by FT-IR, <sup>1</sup>H-NMR, and MALDI-ToF-MS spectra. Molecular weights of the di- and triblock OES-*b*-OEKs were 1712.9 and 2236.7, respectively. The nanostructure

characterization of OES-*b*-OEKs was carried out by using wide and small angle x-ray scattering (WAXS and SAXS) and transmission electron microscopy (TEM). The TEM image clearly showed layered nanoscale structure. The layer spacing in the nanostructures of diblock OES-*b*-OEK was approximately 94 Å, which is in good agreement with that of x-ray scattering data of 91 Å (Fig.2).

## [References]

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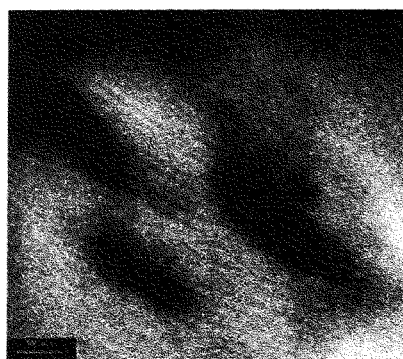
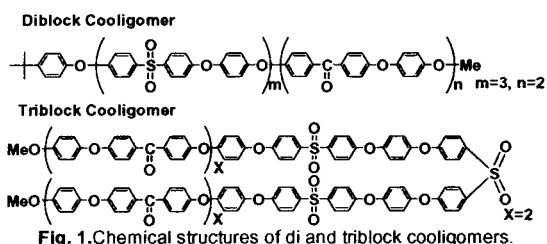


Fig. 2. TEM image of diblock co-oligomer (m = 3, n = 2).