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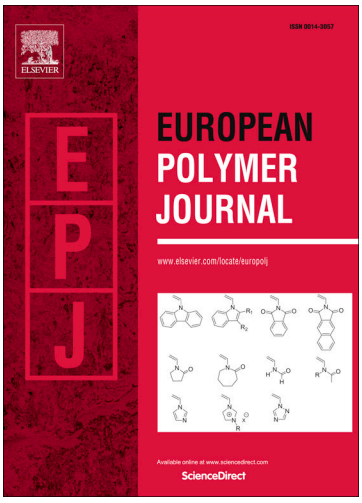

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Stimuli-Responsive Fiber-like Micelles from the Self-Assembly of Well-Defined Rod-Coil Block Copolymer

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ABSTRACT:

A series of photoluminescent fiber-like micelles were obtained in solutions via self-assembly of well-defined rod-coil block copolymers, poly[2,7-(9,9-dihexyl-fuorene)]-b-poly[2-(dimethylamino)ethyl methacrylate] (PFH-b-PDMAEMA), which prepared by combining controlled Suzuki-coupling and atom transfer radical polymerization (ATRP) in a "double controlled" manner. The length of micelles can be varied by changing the solvent mixtures, probably because of the H-type aggregation of the PFH block. The morphology and photoluminescence of these micelles were pH- or temperature-responsive in aqueous. The fluorescence intensity increased with temperature increased and became stronger as the pH increased (pH < 9) but reduced again when the pH further increased (pH > 9). And the morphologies of micelles transited into shorter linear or shuttle-like structures with the change of pH and showed aggregation as temperature-induced. These phenomena may be mainly caused by the structure of micelles and the effect of hydrophillic-hydrophobic transformation of the PDMAEMA corona. Our work provides a push to the synthesis and self-assembly of well-defined rod-coil polymer, and also provides insights into the stimuli-responsive properties of fiber-like micelles.