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A Novel Poly(p-phenylene) Containing Alternating Poly(perfluorooctylethyl acrylate-co-methyl methacrylate) and Polystyrene Grafts by Combination of Atom Transfer Radical Polymerization and Suzuki Coupling Processes

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JOURNAL OF POLYMER SCIENCE PART A-POLYMER CHEMISTRY

Volume: 50 Issue: 23 Pages: 4911-4919

DOI: 10.1002/pola.26320

Published: DEC 1 2012

[View Journal Impact](#)

Abstract

A poly(p-phenylene) (PP), carrying perfectly alternating, well-defined poly(perfluorooctylethyl acrylate-co-methyl methacrylate) [P(FEA-co-MMA)] and polystyrene (PS) side chain grafts, was synthesized by the combination of atom transfer radical polymerization (ATRP) and Suzuki cross-coupling processes. First, dibromobenzene and diboronic ester functional macromonomers of P(FEA-co-MMA) and PS, respectively, were prepared by ATRP. In the second step, PP with lateral alternating P(FEA-co-MMA) and PS chains was synthesized by a Suzuki coupling reaction in the presence of Pd(PPh₃)₄ catalyst. The wetting behavior of the polymers was studied by measurements of the static contact angle theta of thin films (200-400 nm thickness) using water and n-hexadecane as wetting liquids. The obtained fluorinated PP showed high static contact angles with both interrogating liquids, exhibiting simultaneously hydrophobic (theta(w) = 111 degrees) and lipophobic (theta(h) = 67 degrees) properties. (C) 2012 Wiley Periodicals, Inc. J Polym Sci Part A: Polym Chem 50: 4911-4919, 2012

Keywords

Author Keywords: alternating copolymer; atom transfer radical polymerization (ATRP); fluorinated polymer; graft copolymers; hydrophobic; lipophobic; poly(p-phenylene); polystyrene

KeyWords Plus: SURFACE FREE-ENERGY; WELL-DEFINED POLY(EPSILON-CAPROLACTONE); LIGHT-EMITTING-DIODES; SIDE-CHAINS; LIQUID-CRYSTALLINE; CONJUGATED POLYMERS; REGIOIRREGULAR POLY(P-PHENYLENE)S; SUBSTITUTED HYDROQUINONES; BLOCK-COPOLYMERS; ARYL MESYLATES

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Categories / Classification

Research Areas: Polymer Science

Web of Science Categories: Polymer Science

Document Information

Document Type: Article

Language: English

Accession Number: WOS:000310539400015

ISSN: 0887-624X

Other Information

IDS Number: 030AG

Cited References in Web of Science Core Collection: 71

Times Cited in Web of Science Core Collection: 15

