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Reactivity of End-functionalized Polymers Containing Diels-Alder Functional Groups YUAN MENG, YUAN ZHANG, MITCHELL ANTHAMATTEN, University of Rochester — Incorporation of reversible covalent bond into macromolecular systems has proven useful in engineering novel responsive architectures, and Diels-Alder bonding in this context is now well established. However, efficient synthesis of end-functionalized polymers is a major obstacle hindering further development of responsive and modular polymer architectures. In this current research, two immiscible polymers, poly(methyl methacrylate) (PMMA) and poly(benzyl methacrylate) (PBzMA) with controlled molecular weight, bearing terminal furan-maleimide groups, are prepared via Reversible Addition-Fragmentation chain transfer (RAFT) polymerization. The reactivity of such end-functionalized polymers is explored to expose the relationship between chain composition and their ability to undergo modular cross-coupling to form monodisperse block copolymers. To elucidate how reaction conditions affect the efficiency of the Diels-Alder reaction, Hydrogen Nuclear Magnetic Resonance (H-NMR) and Size Exclusion Chromatography (SEC) techniques are actively applied. Experimental results will be interpreted on the basis of dissimilarity between interaction energies of polymer segments and the concentration of reactive groups.

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