

4th European

ORGANIC CHEMISTRY CONGRESS

March 01-03, 2018 | London, UK

Synthesis and thermal properties of difunctional polysulfone telechelics

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Polysulfone telechelics (Cl-PES-Cl and HO-PES-OH, $M_n=2580-12750$ daltons) was prepared. The glass transition temperatures and thermal stabilities were evaluated as a function of molecular weights and the nature of the end groups. It was observed that the increase in the glass transition temperatures was sharper and narrower with dichloro terminated telechelics as compared to the corresponding dihydroxyl terminated ones. In addition, hydroxyl end groups cause degradation at lower temperatures as compared to the chloride end groups. Despite a vast body of published work on PES and some examples of polysulfone telechelics, a systematic study of properties of PES oligomers remain unavailable. Although synthesis of phenoxide-terminated polysulfone oligomers was published, their glass transition and thermal stabilities were not reported. Three series of difunctional poly(arylene ether-sulfone)s macromonomers were successfully synthesized via nucleophilic aromatic substitution polycondensation reaction between bis(4-chlorophenyl)sulfone and three aromatic diols in the presence of potassium carbonate in N,N-dimethylacet amide (DMAc) under nitrogen flow. Telechelics obtained contain systematically increased numbers of repeated unites from 6 to 28, which are useful for the synthesis of complex materials (Figure 1).

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