Abstract

Two monomers, 4',3-5-trifluorodiphenylsulfone, 1, and 4',3,5-trifluorobenzophenone, 2, have been investigated for their potential use as special BB’B”type monomers to synthesize functionalized, linear PAEs via a process called reactivity ratio controlled polycondensation (RRCP). A model study with monomer 1 resulted in a mixture of unreacted starting material, two mono-substitution products (para- and meta-F substitution) and a significant amount of di-substitution products as evidenced by the GC/MS and $^{13}$C DEPT-90 NMR spectroscopy. Conversely, subjecting monomer 2 to similar conditions, using 3-aminophenol (3f) as the nucleophile, afforded mono-substitution exclusively. A series of functionalized, linear PAEs polymers were prepared by reaction of compound 2 with selected phenols to generate functional B2 type monomers in situ, followed by reaction with Bisphenol-A to afford the corresponding linear poly(arylene ether)s. Molecular weight analysis of the polymers showed relatively high molecular weights with broad molecular weight distributions. The polymerization process was accompanied by the formation cyclic oligomers, which could not be removed via re-precipitation. Thermal analysis of the polymers indicated relatively high thermal stability, under a nitrogen atmosphere, with 5 % weight loss temperatures ranging from 380 °C to 459 °C. All the polymers were completely amorphous displaying only glass transition temperatures ranging from 108 °C to 136 °C.