Abstract

A series of functionalized poly(arylene ether)s, PAEs, based on 3,5-difluorobenzene sulfonamides with varying groups on the sulfonamide moiety were investigated. The main goal of the project was to tune the physical properties of the PAEs by altering the organic groups present on the sulfonamide nitrogen atom, including combinations of aryl iodide, alkyl, allyl, 4-ethoxycarboxylphenyl and benzyl moieties.

Using 3,5-difluorobenzenesulfonyl chloride as a starting material, N-R1-N-R2-3,5-difluorobenzenesulfonamides were prepared, followed by conversion to the corresponding PAEs by reaction of 3,5-difluorobenzene sulfonamides with Bisphenol-A, via a typical NAS polycondensation. Copolymers with varying contents of the functional monomer ranging from 10 to 25 %, were prepared using 4,4'-difluorodiphenylsulphone as the comonomer.

The polymers were characterized by size exclusion chromatography (SEC), NMR spectroscopy, thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC). The polymers displayed moderate thermal stability in air while the glass transition temperatures depended on the structure of the R groups.