

Synthesis of Telechelic Polymers for Asphalt Pavements

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Abstract : The continuous growth in population has resulted in an increment in road construction. The road construction requires more lasting and resistant pavements. Among the different applications of polymers, the reinforcement of pavements through the modification of asphalt has demonstrated to be an area of special interest for new polymers. The modified asphalt should exhibit a considerable good performance, good elastic properties and an increment in the performance grade (PG). Some of the current polymers used in asphalt are styrene butadiene styrene (SBS), poly(n-butyl methacrylate)-(glycidyl methacrylate) and ethylene-vinyl acetate EVA. The goal of this study was to synthesize low molecular weight (2,000 - 150,000 D) telechelic polymers to be applied at low concentrations in asphalt in order to modify its rheological properties and make it more resistant and durable. The telechelic polymers were obtained from different molar relationships between tensioned and functionalized olefins by ring opening metathesis polymerization (ROMP) and cross metathesis (CR). The synthesis was carried out under inert conditions with Grubbs second generation catalyst. The reaction efficiency was superior to 96% and telechelic polymers were characterized. The telechelic polymers were used to modify asphalt and the rheological properties of the modified asphalt were evaluated finding that at low concentrations (1%) the PG increased in one or two degrees.

Keywords : asphalt polymers, metathesis polymers, telechelic polymers, modified asphalt

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