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Synthesis of Piperazine Based Polyimide in the Presence of Ionic Liquids

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Abstract: Ionic liquids derived from imidazolium, pyridinium, and alkylammonium salts were investigated not only as catalysts but also as solvents in polymerization of 1,4-bis(3-aminopropyl) piperazine. Results were compared with the conventional polymerizations in N-methylpyrrolidone (NMP). The catalyst has not only a detectable influence on polymer solubility, but also the degrees of polymerization are notably higher. They are even greater than the values obtained by conventional 2-stage polymerization in organic liquids. Ionic liquids based on imidazolium salts seem preferable over pyridinium and alkylammonium salts due to the higher degree of polydispersity of the polyimides obtained. The glass transition temperatures and thermal stabilities were higher for polyimide synthesized in ionic liquids than conventional polyimides prepared in aprotic solvents.

Key Words: Ionic liquids, polyimide, catalysts, condensation polymers

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