

Green Synthesis of Polyimides without Organic Solvents

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Abstract: Polyimides are high-performance polymers which show high thermal and chemical resistance, high mechanical properties, and good dielectric properties. Due to their excellent properties, polyimides can be applied to various application fields, especially for use in dielectric layers in electronic materials and the field of microelectronics. However, due to high boiling point solvents such as N-Methyl-2-pyrrolidone (NMP) used in preparation of poly (amic acid), which is precursor of polyimides, several related environmental problems limit the application of polyimides. In this study, polyimides were synthesized without organic solvents to eliminate the related environmental problems. Since high boiling point solvents are harmful and hard to recycle, only water was used as economically and environmentally suitable substitute for process solvent. Polyimides synthesized via green technology retained high-performance of original polyimides, while the process time and costs are significantly decreased. Thermal stability analysis, structural analysis, and completion of imidization test were conducted to show the performance of resulting organic solvent free polyimides.