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SYNTHESIS AND CHARACTERIZATION OF A NEW ALIPHATIC-AROMATIC POLYAMIDE PREPARED BY IN-SITU INTERFACIAL POLYMERIZATION

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Polyamides are one of the most versatile classes of engineering polymers. Depending on their chemical nature and backbone structures, they display a wide range of properties. They are recognized for their excellent properties in terms of thermal stability, mechanical properties, high glass transition temperature and also good resistance to solvents. Duo to these properties, they have found extensive use in the aviation, automotive, and electronic industries. However those polymers encounter processing difficulty due to their infusibility and poor solubility in organic solvents. Aromatic polyamides indicate a number of useful properties such as high thermal stability, chemical resistance, low flammability, and excellent mechanical properties. Meanwhile, incorporation of imide groups in the backbone of polyamides improves their thermal properties
The present study shows the synthesis of Aliphatic-Aromatic Polyamide by a novel method known as interfacial by polycondensation of ethylenediamine and isophthaloyl chloride at room temperature. The chemical structure of polyamide was verified by infrared spectroscopy (FT-IR), H-NMR and C-NMR. Mechanical and thermal properties of these samples were monitored using tensile testing, thermogravimetric analysis (TGA and DTG) and differential scanning calorimetry (DSC). Finally, it was concluded that the in-situ interfacial polycondensation is a suitable way for synthesis of aliphatic-aromatic polyamides with simple lab-bench scale equipment at room temperature, since these polyamides exhibit non-flammability in addition to unusual heat resistance.