Synthesis of Highly Conducting Nylon 6 Composites and Their Electrical Properties

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Highly conducting Nylon 6 composites are synthesized by exposing Nylon 6 films or fabrics impregnated with an oxidizing agent, cupric chloride, simultaneously to aniline and hydrochloric acid vapors. The conductivity of composite films reaches upto 10^{-2} S/cm and it can be controlled by varying the experimental conditions for the composite synthesis. The effects of the concentration of cupric chloride, the exposure time to anilne and hydrochloric acid vapors, and the concentration of hydrochloric acid to the polyaniline content and the conductivity of Nylon 6/Polyaniline composites are analyzed by means of statistical F test. The morphology change of composite films resulting from the synthesis conditions, the conductivity in relation to the morphology, temperature dependence of conductivity, maximum electrostatic potential and half-life time of composite fabrics in relation to polyaniline content, and the stability of conductivity to ambient air exposure have been investigated.