

Study of Thermal and Electrical Properties of Composite of Polypyrrole with Photosubstituted Complex of Potassium Hexacyanoferrate(III)

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Abstract—Present work involves the synthesis of composite of Polypyrrole with $[Fe(TEMED)(H_2O)(CN)_3].H_2O$ photoadduct via in-situ oxidative chemical polymerisation method using $FeCl_3$ as oxidant. The as synthesised composite was investigated by various spectroscopic and surface characterization techniques. FTIR spectrum of the composite shows the presence of vibrational peaks of photoadduct though with some shift which indicates the successful formation of Composite. XRD shows crystalline structure of photoadduct is retained in the composite. From dielectric study, the magnitude of dielectric constant was found to be 8.9×10^5 at 100 Hz and ac-conductivity of the synthesized composite was found to be 2.9×10^8 S/m at 10^4 Hz. The high value of dielectric constant can make the material suited for charge storage devices. Thermal study was carried out by recording TGA which shows higher thermal stability of composite in comparison to pure polypyrrole. This shows a significant interaction between polypyrrole and photoadduct. The higher thermal stability of the composite enables it to be used for high temperature applications.