

Electrical and Structural Properties of Polyaniline-Fullerene Nanocomposite

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Abstract : In recent years, composites of conjugated polymers with fullerenes (C60) has attracted considerable scientific and technological attention in the field of organic electronics because they possess a novel combination of electrical, optical, ferromagnetic, mechanical and sensor properties. These properties represent major advances in the design of organic electronic devices. With the addition of C60 in the conjugated polymer matrix, the primary photo-excitation of the conjugated polymer undergoes an ultrafast electron transfer, and it has been demonstrated that fullerene molecules may serve as efficient electron acceptors in polymeric solar cells. The present paper includes the systematic studies on the effect of electrical, structural and sensor properties of polyaniline (PANI) matrix by the presence of C60. Polyaniline-fullerene (PANI/C60) composite is prepared by the introduction of fullerene during polymerization of aniline with ammonium persulfate and dodecyl benzene sulfonic acid as oxidant and dopant respectively. FTIR spectroscopy indicated the interaction between PANI and C60. X-ray diffraction proved the formation of a PANI/C60 complex. SEM image shows the highly branched chain structure of the PANI in the presence of C60. The conductivity of the PANI/C60 was found to be more than ten orders of magnitude over the pure PANI.

Keywords : conductivity, fullerene, nanocomposite, polyaniline

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