

Nanofibers of conjugated polymer composites

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Conducting polymer composites with high dielectric constants are being developed by the electronics industry in response to the need for power-grounded decoupling to secure the integrity of high speed signals and to reduce electromagnetic interference. Monodispersed polypyrrole composite nanospheres were synthesized by using Sodium dodecylbenzenesulfonic acid. Pyrrole (Py) was adsorbed onto the surfaces of surfactant -copolymer particle dispersions introducing the electronegative sites onto the surfaces of particles, which the pyrrole cationic ions adsorbed via static forces to surfaces, and Py was oxidatively polymerized to encapsulate the matrix.

In-situ oxidative polymerization of monomer of conjugated polymer in solution favored the formation of the well defined nanoparticles of nanocomposites with a size of ~80-100 nm diameter. Nanofibers of composites were obtained by electrospinning and were characterized in terms of chemical composition, surface morphology, particle size, conductivity, and thermal properties by using NMR, FTIR-ATR, UV-Visible Spectrophotometer, EIS measurements, and Differential Scanning Calorimeter (DSC).

The relationship between PPy content, viscosity and fiber diameter were examined and increasing PPy content caused by decreasing nanofiber diameter, determined by scanning electron microscopy (SEM) and atomic force spectroscopy (AFM) and increase in AC conductivities were determined by Electrochemical Impedance Study.

Effect of fiber diameter on electrical conductivity of nanofibers showed that significant increase in conductivity is observed as the fiber diameter decreases. Due to intrinsic fiber conductivity effect or packing density effect as a result of the reduction in fiber diameter.

Biography

A. Sezai Sarac has completed his Ph.D at the age of 27 years from University of Missouri Rolla and postdoctoral studies from Leeds University. He was the head of Polymer Science & Technology and Dean Faculty of Science at Istanbul Technical University. He has 7 international projects (COST, NATO etc) among the other national projects and published more than 200 papers in reputed journals and serving as an editorial board member of some journals.

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