

Nanocomposites Consisting of Polypyrrole and Molybdenum Disulfide

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Exfoliated nanocomposites consisting of polypyrrole (PPy) and molybdenum disulfide (MoS₂) were synthesized. The MoS₂ was first prepared in an exfoliated state by reacting molybdic acid with a huge excess of thiourea at 500°C under nitrogen flow [1]. The PPy-MoS₂ nanocomposites were prepared by polymerization of pyrrole with ammonium peroxydisulfate, in the presence of the exfoliated MoS₂ [2]. The amount of MoS₂ in the reaction mixture was systematically varied to produce a range of nanocomposite materials ranging from 1 to 50% by mass of MoS₂. The nanocomposites were characterized by Fourier transform infrared spectroscopy, powder X-ray diffraction, scanning electron microscopy, and van der Pauw electrical conductivity measurements. Powder X-ray diffraction provided evidence that the nanocomposites are exfoliated. The diffractograms of the nanocomposites were completely amorphous, suggesting lack of structural order in these materials and indicating the formation of exfoliated systems. It was intriguing to observe that the nanocomposites exhibited enhanced electronic conductivity when compared to the pure polymer.

Biography:

Dr. Rabin Bissessur is a Professor of Chemistry at the University of Prince Edward Island, where he is also currently serving as the Department Chair. His teaching responsibilities include a preparatory course in chemistry, general chemistry courses, analytical chemistry, analytical instrumentation and materials chemistry. Dr. Bissessur received his PhD from Michigan State University. His research interests are in the field of nanocomposite materials, conductive polymers and solid polymer electrolytes. He has authored/co-authored 47 refereed articles, 14 book chapters and 6 educational materials for undergraduate chemistry.