

Abstract Submitted
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Temperature-dependent electron transport mechanism in CS/PEO and CS/PANiES composites.¹ CESAR NIEVES, Univ of Puerto Rico - Humacao, LUIS MARTINEZ, The University of Texas at El Paso, IDALIA RAMOS, ANAMARIS MELENDEZ, NATALYA ZIMBOVSKAYA, MARGARITA ORTIZ, NICHOLAS PINTO, Univ of Puerto Rico - Humacao — Carbon spheres (CS) were prepared via hydrothermal method using an aqueous solution of sucrose and heated at 400C. The spheres were thermally annealed in N₂ at 800C to increase the conductivity due the elimination of functional groups on the surface of the CS. Electron transport as function of temperature was studied using an insulating (polyethylene oxide-PEO) and a conducting (polyaniline-PANiES) polymer. Electrical characterizations of the composites were carry out showing Ohmic current-voltage response and temperature-dependent conductivity in the range of 80K to 300 K. The dependence of conductivity on temperature was theoretically analyzed to determine predominating mechanisms of electron transport. A conductivity maxima at 258K was observed in the CS/PEO composite but was absent in the CS/PANiES composite. While thermally induced-tunneling and thermal activation are responsible for electron transport in CS/PEO, variable range hopping (VRH), thermally induced-tunneling, and thermal activation are responsible for electron transport in CS/PANiES composite.

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