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Effects of confinement on the transport properties of CSA doped polyaniline RAUL PEREZ, NELIZA LEON, IDALIA RAMOS, NICHOLAS PINTO, Department of Phys. and Electr., University of Puerto Rico - Humacao, PAWAN KAHOL, Dept. of Physics, Astronomy and Materials Science, Missouri State University — Polyaniline doped with camphor sulfonic acid (CSA) and cast from m-cresol can exhibit metallic behavior depending on the conditions of preparation. Under standard methods of preparation the transport properties of cast films generally lie on the insulating side of the metal-insulator transition. We have confined CSA doped PANi into the cylindrical pores of a dielectrically inert porous matrix and measured the temperature dependence of the resistance. The resistance of the confined polymer is seen to have a weaker dependence at low temperatures than that of the cast film. Further analysis of the results show that the charge transport of the confined polymer has moved into the metallic regime while that of the cast film lies in the insulating regime. Reduced barriers to charge transport that result from the suppression of microphase separation of the non-dopable forms of polyaniline due to extreme confinement in the porous matrix are believed to be responsible for this crossover.

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