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RESEARCH ARTICLE

Polyphenylene sulfide-graphite hybrid composites: Charge transport and impedance characteristics

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Abstract: Hybrid composites with expanded graphite (ExGr) as the second conducting component in PPS-7 wt% graphite have been prepared by powder mixing method. The percolation threshold in the hybrid composites lies at 0.25 wt% ExGr. Addition of 1 wt% ExGr in PPS-7 wt% graphite increases through plane conductivity by six orders compared to 0 wt% ExGr addition. The ac conductance study reveals that insulator- semiconductor transition occurs at higher loading of ExGr in hybrid composites. For

0.75 wt% ExGr addition in PPS-7 wt% graphite, the charge transport occurs by hopping mechanism. Expanded graphite sheets predominantly occupy intergraphite spaces in hybrid composites. Impedance measurement has been carried out to evaluate interfacial capacitance which increases with enhanced ExGr loading. The composites are characterized by SEM, Impedance etc.

Keywords: Hybrid composites · Scanning electron microscopy · Conductivity · Conducting polymer composites · Impedance