

1. Structure and electrical properties of polypropylene-graphite-carbon black/nanotubes hybrid conducting composites

By Radhakrishnan, S.; Mehta, Hrusha; Khare, A.; Ramanujam, B. T. S.

Edited By:Laudon, Matthew; Romanowicz, Bart

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In the attempt to make low cost **conducting** polymer composite materials for fuel cell / battery applications, **polypropylene** (PP) with **graphite** (Gr) and other **carbon black/ nanotubes hybrid** materials were investigated. The development of **cryst. structure in polypropylene (PP) graphite** composite was studied with respect to compn. and processing conditions. The DSC and XRD data confirmed the preferential nucleation and beta **cryst. phase formation** for the binary PP-Gr **composites**. There was dramatic increase in the elec. cond. by addn. of small amt. of thrid component (CNT <5%) to the binary PP-Gr composite even at low **graphite** loading of 10%. Impedance spectroscopy anal. showed that the interfacial capacitance, with the addn. of 2.75 wt% CB in PP-7 wt% **graphite**, increases to 52 pF from 31 pF for PP-7 wt% **graphite** proving the occupation of CB particles in the interspaces of **graphite** particles. The results of elec. cond. were correlated with the nucleation and **crystn.** of the beta phase of PP by **graphite** flakes leading to interfacial resistive layer in binary **composites** while suppression of these effects in the ternary **composites**.

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