Increase the Conductivity and the Crystallinity of PP by CNPs

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We present a simple two-step approach for preparing large uniform sheets of carbon nanoparticles/ polypropylene (CNP/PP) nanocomposites. Fragmented pieces of the nanocomposite produced by solution mixing are fused into large uniform sheets using hot compaction for short time. Nanocomposite samples with CNP content of 10, 15, and 20 wt% were prepared using this approach and characterized using XRD and impedance spectroscopy. The crystallinity of the PP matrix increases with increasing the CNPs content due to their nucleating effect as revealed from the analysis of the XRD results. Impedance spectroscopy is used to determine the electrical conductivity of the nanocomposites. Nyquist plots and equivalent circuit modelling are used to extract the bulk resistance, which is in turn used to calculate the conductivity using self-developed fitting routines. Samples without adding CNPs content exhibit a conductivity of 10^-15 S/m S/m which increases to 6*10^-5 S/m in the sample with 20 wt% CNPs . As a future plan, we will use the compatibilizer as a part of our solution and the nanocomposite to investigate its effect on the conductivity of PP.

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