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Copper Oxide Based Polymer Nanohybrid for Chemical Sensor Applications

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Abstract

PCC based nanohybrid has been synthesized by simple intercalation of CuO nano-sheets into PPC matrix. The morphological and physicochemical structure of nanohybrid was characterized by X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM), Energy dispersive spectroscopy (EDS), and Fourier transforms infrared spectroscopy. Interestingly, the morphology of CuO nano-sheets was changed into nanoparticles after intercalation into the polymer matrix. From application point of view, chemical sensing performance of PPC and nanohybrid was investigated by simple I-V technique using nitrophenol as an organic pollutant. By applying to nitrophenol sensing, both PPC and nanohybrid performed as best nitrophenol chemi-sensor in terms of sensitivity. Nanohybrid showed 11.25 times higher sensitivity (4.50 $\mu\text{A.cm}^{-2}.\text{mM}^{-1}$) than pure PCC (0.40 $\mu\text{A.cm}^{-2}.\text{mM}^{-1}$). Therefore, nanohybridization is an efficient route to improve sensing performance of PPC.

Keywords

Author Keywords: Poly propylene carbonate; CuO nano-sheet; Nanohybrid; Organic pollutants; Nitrophenol; Chemical sensing

KeyWords Plus: WATER SORPTION PROPERTIES; POLY(PROPYLENE CARBONATE); PHOTOCATALYST; NANOCOMPOSITES; SILICA; MONTMORILLONITE; INTERCALATION; NANOPARTICLES

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