Synthesis and characterization of organic acid doped poly(N-ethylaniline): A material for ammonia sensing application

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Abstract: Poly(N-ethylaniline) (PNET) salts doped with organic acid (ascorbic acid) in presence of acrylic acid and HCl were synthesized by aqueous chemical oxidative polymerization method. The polymers were characterized by physical, electrical and spectral methods. This is a facile chemical route developed for the direct synthesis of conducting emeraldine salt phase, which exhibit remarkable improved solubility in common organic solvent. The UV-visible spectra of ascorbic acid doped poly(N-ethylaniline) in m-cresol showed a free carrier tail which is characteristic of extended coil conformation. FTIR and XRD studies shows the higher doping level, crystallinity and conductivity than HCl doped polymer. The results also revealed that morphology of ascorbic acid doped PNET was remarkably different from HCl doped PNET. The synthesized material was used as sensor for ammonia. Comparisons of the responses of two polymers reveal that the acrylic acid doped polymer exhibit higher sensitivity and reversibility. Further the resistance is observed which decreases on exposing the acrylic acid doped PNET to ammonia vapors. A reverse trend is observed in the case of HCl doped PNET. The results are explained and characterized by physical, electrical and spectral methods.

Keywords: poly(N-ethylaniline), ascorbic acid, solubility, crystallinity, ammonia vapor sensor.

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