

The work is mainly based on detail study on synthesis, characterization, doping and gas sensing prosperities of poly(m-aminophenol) (PmAP) and its silver nanocomposite. Processability of polyaniline (PANI) is a challenge for material chemists and one of the major approaches to improve its processability is by making PANI derivatives. But in case of polyaminophenol (a hydroxyl derivative of aniline) the processability of the polymer is further lower than the PANI due to ladder structure of the synthesized polyaminophenol in acid medium. In this investigation a processable PmAP was synthesized. The synthesized PmAP was soluble in aqueous sodium hydroxide, dimethyl sulfoxide, dimethylformamide etc. and a free standing film was prepared from the solution casting in dimethyl sulfoxide. We have also worked on the isomers of aminophenol to explain the difference in structure and properties of polyaminophenol isomers. Again the effects of dopant and doping conditions were studied for the PmAP to get better polymer in terms of conducting properties. Among various inorganic acids, sulfuric acid was found to act as best dopant than other inorganic acids. Here the novelty of our work is that the doping procedure is different than the reported one for PANI and its derivatives and the stability of the dopant inside the polymer is quite good. Then we have used this sulfuric acid doped polymer as an aliphatic alcohol sensor material with improved response. The sensing properties of doped PmAP were explained with the help of a proposed mechanism. We have also optimized the incorporation of silver nanoparticles in the PmAP matrix during the film casting of the polymer from the dimethyl sulfoxide solution. The conductivity of the nanocomposite polymer film was increased and to further increase the conductivity of the silver polymer nanocomposite it was doped with hydrochlorie acid (HCl). The HCl doped silver polymer nanocomposite showed very good response for ammonia vapor. Under the sections PmAP synthesis and characterization procedure are repeated for instant referring and better clarifications.

Keywords: Polyaminophenol, Conducting polymer, Silver-nanocomposite, Alcohol sensor, Ammonia sensor, Inorganic acid doping, Characterization, Conductivity.