

The use of conducting composite polymers of PANI and PPY in different electrochemical devices

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In this research we have studied the d.c. conductivity, σ , of zeolite/polyaniline (PANI) and zeolite/polypyrrole (PPy) blends of various concentrations in zeolite and the application of these compounds in the construction of various electrochemical devices. Our studies show that PANI/Zeolite and PPy/Zeolite at certain ratios (w/w) exhibits very good conductivity as well as a slow thermal aging. We have used such properties in the construction of an electrochemical cell of a Pt particles layer on a conducting polyaniline/zeolite and PPy/zeolite blend. Our results show that these sensors are stable in aqueous electrolyte solutions of low pH value at temperatures up to 45°C with response time in seconds. The ability of zeolite to accommodate and neutralize a great number of cations with all three mechanisms, adsorption, intercalation, and cation exchange reaction, combined with the high conductivity and stability of HCl—protonated polyaniline, which interposes into its laminar structure and the good contact between zeolite surface and polyaniline, make the polyaniline/zeolite composites very

suitable for use as a cathode electrode in dry electrical primary coin cells. Our results show that when Polyvinylalcohol (PVA) gel was used as the electrolyte and a Mg foil as the anode, the e.m.f. values of the cells ranged from 1.62 to 1.94 V, their specific energies from 4.34 to 8.88 Wh/kg and their energy densities from 3.10 to 6.34 mWh/cm³ for cathodes containing 10–50 w% zeolite. Moreover, surface examination of the different samples, was performed by EDS analysis, scanning electron microscopy (SEM) and atomic force microscopy (AFM) techniques