

# BIOCHEMICAL SYNTHESIS OF WATERBORNE CONDUCTING MOLECULAR COMPLEX OF POLYANILINE AND POLYURETHANE IONOMERS AS NEW TEMPLATES III

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After the successful synthesis of polyacetylene by Shirakawa and co-workers [1], conducting polymers have attracted much scientific and technological interest in recent years because of their many possible applications [2]. A significant portion of these studies has been devoted to polyaniline (PANI) and this constitutes a large family of polymers which are formed by oxidative either electrochemically or chemically polymerization aniline or its derivatives. There has been a tremendous interest in the use of conducting polymers in electronics applications because the wide ranges of electrical, electrochemical and optical properties as well as their good environmental stability [3]. Use of polyaniline has remained limited because of cost prohibitive chemical synthetic procedures, electrical instability, poor processability, environmental incompatibility and poor solubility in common solvents. For practical applications, it is necessary to obtain a polyaniline with improve processability and high molecular weight. Enzymatic polymerization has been explored as an alternative approach to the synthesis of electronically and optically active polymers [4]. In the present work we report the enzymatic polymerization of aniline in the presence of a new template (sulfonated polyurethane elastomer) polyelectrolyte. synthesized from aqueous dispersion of sulfonated polyurethane elastomer (Ionomer), which serves as a matrix within which the monomers align and preferentially react to form water - soluble, electrically active polyaniline. The synthesis is simple, and the conditions are mild in that the polymerization can be carried out in a pH 4.6 with stoichiometric amount of hydrogen peroxide and a catalytic amount of enzyme. The ring stretching of quinoid and benzenoid forms (FTIR) are observed at 1586 and 1485  $\text{cm}^{-1}$ . The C-N (aromatic) stretching blend of an aromatic amine appears at 1295  $\text{cm}^{-1}$ . The absorption peaks in UV-Vis spectra (PU-PANI blend) are at 400 and 760nm, respectively, values characteristic of doped PANI Figure 1. Cyclic voltammogram of PU-doped PANI blend, with scan rate of 50 mV/s in the electrolytic PU dispersion in PH=4.7 is shown in Figure 2. The voltammogram shown that this polymer is electroactive. Two distinct pair of peaks can be seen in the voltammogram.

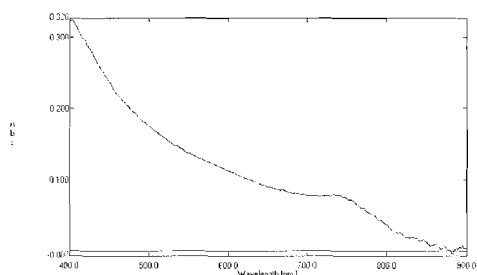


Figure1: UV-visible of (PU doped PANI)

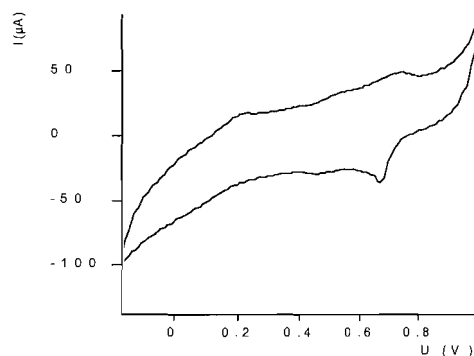


Figure2: CV of (PU-PANI)

## References

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