E1 205

An electrochemical quartz crystal microbalance study on polypyrrole

Polypyrrole, one of the versatile conducting polymers (CP), can be deposited on metal electrodes by electropolymerization in the presence of suitable ions. Utilization of the electrochemical quartz crystal microbalance (EQCM) in conjugation with electrochemistry allows one to determine mass chages of the film simultaneously with electrochemical reactions under in situ conditions. This technique has been widely used to elucidate the role played by the ions and solvent molecules during the preparation and redox processes of conducting polymers, In the present study, this technique was applied to investigate the mass changes during polymerization and ion movement during the redox processes of polypyrrole films prepared with sodium dodecylbenzenesulfonate (SDBS).

Films were prepared on AT cut quatrz crystals (10 MHz) using the galvanostatic method with Ag/AgCl (Metrohm) as the reference electrode and Pt(Metrohm) as the counter electrode. Polymerization electrolyte contained 0.05MSDBS and 0.05M pyrrole monomer. Cycling tests were carried out on the films in 0.1 M $NaCLO_4$ electrolyte with different sweep rates.

It has been found that both cations and anions move during the redox processes in Ppy/DBS films. Cation movement occurs at lower oxidtion potentials while the anion.

Novement at higher potentials. According to the mass changes obtained, it can be concluded that a large amount of water transport takes place along with the cations.