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Electrochemical Synthesis and Study of Polyanilines with Covalently Attached Acidic Groups

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Abstract: Abstract: Electrochemical copolymerization of aniline and its carboxylic acid and hydroxyl derivatives, postpolymerization electrochemical treatment of polyaniline films as well as electrochemical properties of obtained films are discussed. Synthesized copolymer films with carboxylic, hydroxyl and sulfonic groups were investigated by voltammetric and impedance techniques in electrolytes of different pH, in order to determine pH dependence of their electrical and redox properties. All co-monomers show inhibiting effect on electrochemical polymerization rate of aniline, thus making the ratio of aniline to co-monomer important variable. Copolymers with carboxylic and hydroxyl groups have well defined redox behavior in solutions of higher pH, while they remain fairly insoluble. Sulfonic acid derivatives also show redox activity in solutions of higher pH but cannot sustain as insoluble freestanding films.

Sažetak

Elektrohemijska kopolimerizacija anilina i njegovih derivata sa karboksilnom i hidroksilnom grupom, postpolimerizacijski tretman polianilinskih filmova kao i elektrohemijske osobine dobivenih filmova su diskutovani. Sintetisani kopolimerni filmovi sa karboksilnim, hidroksilnim i sulfonskim grupama su ispitani voltametrijskim i impedansnim tehnikama u elektrolitima različitih pH, sa ciljem određivanja pH zavisnosti njihovih električnih i redoks osobina. Svi komonomeri pokazuju inhibitorski efekat na brzinu elektrohemijske polimerizacije anilina, što čini odnos anilina i kopolimera bitnom promjenjivom. Kopolimeri sa karboksilnim i hidroksilnim grupama imaju dobro definisano ponašanje u rastvorima viših pH, pri čemu ostaju prilično nerastvorljivi. Derivati sa sulfonskom grupom takođe pokazuju redoks aktivnost u rastvorima viših pH ali ne mogu da se zadrže kao nerastvorni filmovi.