ELECTRICAL CONDUCTING SURFACE MODIFICATION OF ANIONIC BIOPOLYMER: REDOX POLYINONIC MATERIALS FOR ELECTROCHEMICAL SENSORS

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A series of electrically conductive hybrids was facilely synthesized with anionic acacia gum hydrocolloids and polyaniline through radical copolymerization method. The adventitiously improve surface with PANI having good solubility in common solvents, high mechanical strength and infusibility at traditional melt-processing temperatures with significant processability such as biodegradability and biocompatibility. The chemical structure of the resulting acacia gum-polyaniline hybrid (AG-PANI) was characterized using UV-vis, FTIR and ^{1}H NMR spectroscopy. Its surface morphology was further studied with scanning electron microscopy (SEM) and compared with the topography of polyaniline and acacia gum. AG-PANI exhibited surface electrical conductivity and was investigated with respect to composition of aniline to acacia gum, pH and temperature. Under controlled conditions, material showed control electrical conductivity in the order of 10^{-4} Scm^{-1} at room temperature. The cyclic voltammogram of AG-PANI electrode vs. Ag/AgCl in 0.5 M HCl showed three anodic peaks at 0.20, 0.58, and 0.64 V, along with two cathodic peaks at 0.50 and 0.40 V with large capacitive background currents. The electrochemical response of AG-PANI electrode was completely reversible and would significantly use as sensors. It could be interesting to combine biopolymer colloids with conducting polymers and yielded eco-friendly hybrid materials for technological applications.