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Electrochemistry of Ring-Substituted Polyanilines: Effect of Substituents on Electronic Properties†

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Poly(o-methylaniline) and poly(o-ethylaniline) have been synthesized by chemical as well as electrochemical methods from the corresponding monomers. The polymers were characterized by elemental analysis, UV-visible spectroscopy and cyclic voltammetry. Upon treatment with 1 M HCl, the conductivity of the polymers increased from $\sim 10^{-8}$ S/cm to $\sim 10^{-1}$ S/cm for poly(o-methylaniline) and to $\sim 10^{-3}$ S/cm for poly(o-ethylaniline). The conductivities, optical spectra and electrochemical behavior of the o-alkylsubstituted polymers are compared with those of polyaniline. The differences are attributed primarily to the steric effect of the alkyl substituents, which alter the torsion angle between the $-C_6H_4-$ rings of the polymer.

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