

# Turkish Journal of Chemistry

Turkish Journal

of

Chemistry

Electrochemical Polymerization and Analysis of Some Aniline Derivatives

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**Abstract:** In this study, conductive homopolymers of o-chloroaniline, p-bromoaniline and N-methylaniline were synthesized electrochemically in perchloric acidic solution and their properties were analyzed. Initially, the maximum oxidation potential values of these monomer solutions were determined by Cyclic Voltammetry (CV). Their conductive polymers were then synthesized under a nitrogen atmosphere using a potentiostat. FTIR spectra were taken in order to analyze the structural properties of the resulting polymers. Thermogravimetric analysis (TGA) was conducted and surface micrographs were taken by a Scanning Electron Microscope (SEM). The conductivity levels of the polymers were determined by the Four Probe technique. Magnetic properties of the samples were analyzed and the conduction mechanisms were examined. Based on the resulting conductivity data, it was concluded that poly(p-bromoaniline) was of polaron structure, whereas poly(o-chloroaniline) and poly(N-methylaniline) were of bipolaron structure. Thermogravimetric analysis results indicated that poly(N-methylaniline) has the highest maximum decomposition temperature, and conductivity measurements revealed that poly(o-chloroaniline) has the highest conductivity level.

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Turk. J. Chem., **22**, (1998), 301-308.

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