

Electrochemical investigations of tetraphenylethylene in dimethylformamide using fourier transform faradaic admittance measurements (FT-FAM).

Autorzy

Maria Grzeszczuk

Donald E. Smith

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Streszczenie

We have investigated the electrochemical reduction of tetraphenylethylene in dimethylformamide-0.10 M tetrabutylammonium tetrafluoroborate electrolyte. The array processor enhanced version of the FT-FAM instrumentation was used in these studies. Extensive measurements, including temperature and concentration dependence, were performed. Analysis of the data led to the conclusion that the observed wave represents a two-electron reduction with a very small potential separation (ΔE) between the first and second waves so that the waves overlap and only one admittance peak is observed at all frequencies. This electron transfer pair is coupled to a reversible homogeneous redox reaction ("nuance of the EE mechanism"). Other mechanisms, such as the simple EE and ECE without "nuances", were inconsistent with one or more aspects of the data arrays obtained. The mechanism presented is the only one examined which seems consistent with all aspects of the experimental results. The estimation of thermodynamic and kinetic parameters is discussed, showing that it is possible to obtain reasonably accurate values of all relevant parameters. Three unique theoretical working curves were developed for this study. This investigation is especially illustrative of the power of the array processor enhanced FT-FAM instrumentation.

Adres publiczny

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