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SHAPE SELECTIVE AND ELECTRON TRANSFER CHARACTERISTICS OF SOME STYRYLPYRIDINIUM SALTS ENCAGED IN POLYMERIC INTERCALATED COMPLEXES

A Thesis
Submitted to the Faculty of Science
Tanta University

BY

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بسم الله الرحمن الرحيم

to the smile in my life
my Wife,
Moustafa and Rana

CURRICULUM VITA

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ACKNOWLEDGEMENT

I wish to express my deep thanks and gratitude to *Prof. Dr. Safaa Eldin H. Etaiw*, Professor of Physical and Inorganic Chemistry, Faculty of Science, Tanta University, and to *Prof. Dr. Günter Grampp*, Professor of Physical Chemistry and Head of Institute of Physical and Theoretical Chemistry, Technical University Graz, Austria, for suggesting and supervising this work. Also, their valuable discussions and interpretations of the results are very appreciated. Also, I wish to thank *Dr. Samy S. Assar*, Lecturer of Physical Chemistry, Faculty of Science, Tanta University, for his interest to follow up the work through out the thesis.

My appreciation also extends to many of my Colleagues at the Chemistry Department, Faculty of Science, Tanta University, and also at the Institute of Physical and Theoretical Chemistry, Technical University Graz, Austria, for their cooperation and creating the nice atmosphere during the time of this work.

Contents

Page

CHAPTER I: Introduction

CHAPTER II: Experimental Section

RESULTS AND DISCUSSION:

CHAPTER III: The Electrochemical Reduction of the Investigated Styrylpyridinium Iodides.

CHAPTER IV: Intercalation of 1-Methyl-4-(4'-R-styryl)pyridinium Iodides Within the Cavities of the Three Dimensional Polymeric Host $[(Me_3Sn)_3Fe(CN)_6]_\infty$.

CHAPTER V: Kinetics of the Back Electron Transfer Reaction of 4'-Nitrostyrylpyridinium Iodides.

Aim of the Work

Since styrylpyridinium compounds found various technical and scientific applications in different areas, it seemed desirable to perform some detailed investigations with these compounds. Not only the photochemical trans ⇌ cis isomerization or the well-defined solvatochromic shift, but also the interactions with three dimensional polymeric complexes forming host-guest intercalation complexes call for detailed photochemical, photophysical as well as electrochemical and kinetic measurements.
The aim of this thesis should be a detailed description of the compounds used, beside an intensive literature survey at the beginning.

With regard to the measurements of the photoinduced electron transfer kinetics it is necessary to determine the electrochemical redox potentials of all compounds. In this frame detailed investigations of the electrochemical behaviour should be done by using cyclic voltammetry. The reversible or irreversible reaction behaviour of the substances should be determined. As far as possible a complete characterization of the properties of the intercalated complexes should be made, including elemental analysis, IR spectra, diffused reflectance spectroscopy and cyclic voltammetry.

A main part of the work should be the time-resolved kinetic measurements of the back electron transfer reactions in the presence of suitable donors. The transients produced by excitation are assumed to have radical characters. The kinetics should be measured in different solvents to get some insights on the reaction mechanism including contact- and solvent separated ion pairs. The driving force of the electron back-transfer reaction can be varied by using different electron donors. All the results obtained, including rate constants, driving forces etc. should be interpretated in the sense of Marcus electron transfer theory.

CHAPTER (I)

INTRODUCTION