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Polypyrrole synthezited with oxidative cerium(IV) ions

A. S. Saraç*, C. Erbil, and B. Ustamehmetoğlu

Istanbul Technical University, Department of Chemistry, Maslak, TR-80626-Istanbul, Turkey

SUMMARY

The chemical oxidation of pyrrole by Ce(IV) salts in aqueous solutions or water-acetonitrile system has been studied. Products were characterized by elementel analyses, FT-IR and conductivity measurements. Conductivity values of polypyrrole complexes synthesized in aqueous solutions are comparable with those in acetonitrile-water, if suitable oxidant/monomer ratio and $[H^+]$ are selected.

INTRODUCTION

Among the conducting polymers, polypyrrole (PPy) has received a good deal of attention because of its high electrical property, enviromental stability and ease of synthesis [1,2]. Highly conductive PPy has been prepared by various methods, such as electrochemical polymerization [3-4], chemical polymerization, by mild oxidative transition metal ions [2,5].

Since Ce(IV) is capable of polymerizing vinyl monomers effectively [6-8], it was challenging to study polymerization of pyrrole by the use of strong oxidants such as Ce(IV) ions, namely ceric(IV) ammonium nitrate (CAN) and ceric(IV) sulphate (CS) in some detail. So, in this study, the effect of monomer, ligand and metal ion concentration, and solvent were investigated. The conductivities of PPy complexes obtained showed variations in the range of literature values [9,10], depending on the conditions.

* Corresponding author