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Spectroscopic and Thermodynamic Studies on Charge Transfer Complex Formation between 2-Aminopyridine and 2,5-Dihydroxy-*p*-benzoquinone

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Abstract Charge transfer complex formation between 2-aminopyridine (2AP) as the electron donor with 2,5-dihydroxy-*p*-benzoquinone (AHBQ) as the π-electron acceptor has been investigated spectrophotometrically in acetonitrile (AN) and 50% acetonitrile + 50% 1,2-dichloroethane (V/V), (ANDC). The stoichiometry of the complex has been identified by Job's method to be 1:1. The Benesi-Hildebrand equation has been applied to estimate the formation constant (K_{CT}) and molecular extinction coefficient (ε). It was found that the value of K_{CT} is larger in ANDC than in AN. The thermodynamic parameters are in agreement with the K_{CT} values in that the enthalpy of formation ($-\Delta H$) has a larger value in ANDC than in AN, suggesting higher stability of the complex in ANDC. The complex formed between 2AP and DHBQ has been isolated as a solid and characterized using elemental analysis, FTIR, and ^{1}H NMR measurements. Moreover, it has been found that the formed complex involves proton transfer in addition to charge transfer.

Keywords Spectrophotometry · CT-complex · 2-Aminopyridine · 2,5-Dihydroxy-*p*-benzoquinone

1 Introduction

The formation of charge transfer (CT) complexes between σ- and π-acceptors with different π- and n-donors has been widely investigated [1–3]. Recently, there has been increased interest in the chemical and physical properties of CT complexes formed by the reactions of σ- and π-acceptors with different amines, polysulfide bases, crown ethers and oxygen-nitrogen mixed bases [4–7]. This interest stems mainly from various applications of the CT

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