



ORIGINAL ARTICLE

Hydrophobicity, reactivity trends of base catalyzed hydrolysis of some novel high spin Fe(II) Schiff base amino acid chelates in some binary aqueous solvent mixtures: Initial-transition state analysis



Laila H. Abdel-Rahman, Rafat M. El-Khatib, Lobna A.E. Nassr,
Ahmed M. Abu-Dief *

Chemistry Department, Faculty of Science, Sohag University, 82534 Sohag, Egypt

Received 7 October 2013; revised 11 November 2013; accepted 14 November 2013
Available online 26 November 2013

KEYWORDS

Solvent;
Hydrophobic;
Hydrophilic;
Kinetics;
Hydration;
Solvolytic;
Reactivity;
Initial state-transition state

Abstract Rate constants for the base hydrolysis of bis(naphthylidene alanate)iron(II) (nali), bis(naphthylidene phenylalanate)iron(II) (nphali), bis(naphthylidene aspartate)iron(II) (nasi), (naphthylidene histidinate)iron(II) (nhi), bis(naphthylidene arginate)iron(II) (nari) have been reported in different binary aqueous solvent mixtures at 298 K. The observed reactivity trends are discussed in terms of the hydrophilic and hydrophobic forms of the complexes investigated, as well as the transfer chemical potentials of the hydroxide ion and the complex. Both the solvent–solute and solvent–solvent interactions have been considered. The hydrophobic character of the complexes studied was manifested by a decrease in reactivity. Solvent effect on reactivity trends of the investigated complexes have been analyzed into initial and transition state components. This can be achieved by using the transfer chemical potentials of the reactants and the kinetic data of the studied compounds. The decrease in the observed rate constant values (k_{obs}) of the base hydrolysis of the investigated complexes with increase of solvent% is dominated by the initial state (IS).

© 2013 King Saud University. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

* Corresponding author. Tel.: +20 1064162700; fax: +20 934601159.

E-mail address: ahmed_benzoic@yahoo.com (A.M. Abu-Dief).

Peer review under responsibility of King Saud University.



Production and hosting by Elsevier

1. Introduction

Schiff base amino acid complexes act as good chelating agents [1–3] and behave as efficient biologically active [4–5] and cytotoxic [6] agents. In addition, Schiff base amino acids complexes are considered to constitute new kinds of potential antibacterial and anticancer reagents [3,4,7,8].