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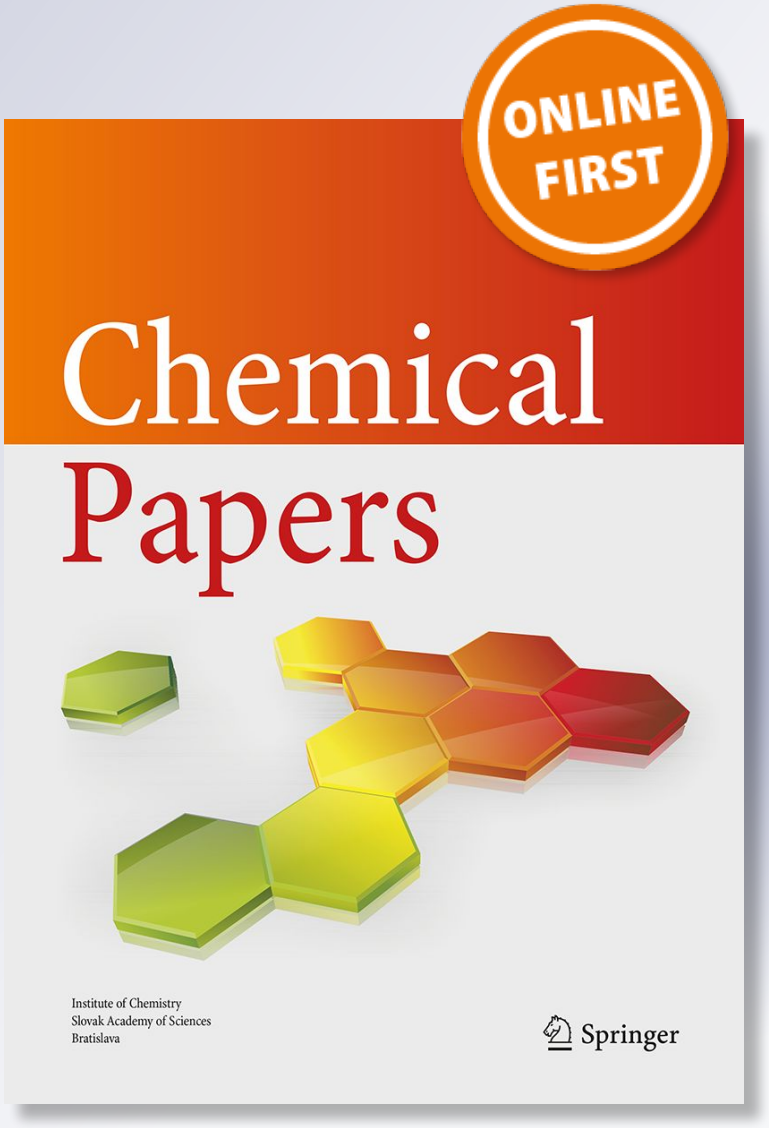

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ORIGINAL PAPER

Study of adduct compounds between oxovanadium complexes VO(IV) and some biological relevance using FTIR technique

Ahmed Majeed Jassem[1] · Mohammed Qasim Mohammed[1] · Raed Aubed Alharis[1] · Hadi Abdalsamad Jabir[1] · Intisar Naser Alzearah[1]

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Abstract
Oxovanadium(IV) complexes $[VO(HL1)_2]$ and $[VO(H2L2)_2]$ from 2-aminobenzoic acid (HL1) and 2-hydroxybenzoic acid (HL2) were synthesized and characterized by ^{1}HNMR, ^{13}CNMR, mass (ESI–MS), X-ray diffraction (XRD), conductivity measurements, FTIR spectral data, and melting points. Based on the above analytical data, the complexes have the general formula $[VO(HL)_2]$. The interaction of the complexes with donor compounds (biological relevance) was performed and investigated with absorption spectroscopy. 1:1 Adduct compounds of oxovanadium complexes as an acceptor with adenine, cytosine, and guanine as an electron donor were studied by FTIR technique and viscosity measurements. FTIR technique was used to determine the binding constants for adduct compounds.

Keywords Oxovanadium(IV) complexes · Adduct compounds · Binding constants · FTIR technique

Introduction

The study of metal-drug coordination molecules is becoming more popular than before in importance specifically in the design of more biologically important drugs (Akinremi et al. 2011; El-Megharbel et al. 2018). The interaction of transition metal complexes with biological site in nucleic acids, proteins, and phospholipids is a major area of research due to the exploitation of these complexes in the design and development of synthetic chemotherapeutic agents (Domingo 1996; Garribba et al. 2001; Ahmed-Ouameur et al. 2006; Kanellis and dos Remedios 2018). Metal complexes which can bind to nucleic acids are acquiring a considerable attention having their diverse applications in the field of bioinorganic chemistry, diagnostic agents, medical applications, and development of cleavage agents for probing nucleic acid structure (Pyle and Barton 1990; Sigman et al. 1993). Especially, a number of metal complexes with various ligands have been studied in view of their affinity towards (DNA) and particularly for the (DNA) base sequence recognition (Kumaravel and Raman 2017; Aboafia et al. 2018). The interaction of some kind of metal complexes with DNA could motivate the breakage of (DNA) strands by appropriate methods (Routier et al. 1996; Singh et al. 1999; Sasmal et al. 2010a, b; Prasad et al. 2011). RNA can also play significant role in drug designing as it is also a prime source for many deadly diseases (Watanabe et al. 2007). Thus, the binding of small molecules of RNA property with metal complexes has also attracted the researcher for drug discovery process (Thomas and Hergenrother 2008). The development research of bioinorganic chemistry has raised an interested attraction in vanadium complexes, because it has been found that majority of these complexes may utilize as models for biologically active species (Shiva et al. 2011; Al-Amiery et al. 2012). Oxovanadium(IV) complexes represent a significant position in metallo pharmaceuticals due to its pharmacologically active functions (Bian et al. 2012). Some kind of oxovanadium compounds can exert an effective influence against chemical carcinogenesis in animals by inducing cell cycle arrest through DNA cleavage and fragmentation (Cruz et al. 1995). The study of the charge transfer between vanadium complexes and various electron donors has attracted considerable interests and growing importance owing to their important physical and chemical properties (Oza et al. 2005; Refat et al. 2006). The interaction of some kind of vanadium complexes with deoxyribonucleic acid (DNA) has been investigated to help the design of

✉ Ahmed Majeed Jassem
ahmedmajeedhsskia@gmail.com

[1] Department of Chemistry, College of Education for Pure Sciences, Basrah University, Basrah, Iraq

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