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XI. IMCOFE
MIGRATION AND CLIMATE CHANGE

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FOREWORD

IV. International Congress on New Trends in Science, Engineering and Technology (ICONTRENDS) was held by "Young Scholars Union" at St.Petersburg/RUSSIA from 7 to 9 July 2020. ICONTRENDS is aimed to come together with scientific studies scholars working in different disciplines, to exchange knowledge and experiences and thus to prepare the ground for multidisciplinary studies.

A total of 64 papers were submitted. 64 participants from 8 countries in total have attended the congress. 30 participants from Turkey, 19 participants from Azerbaijan, 7 participants from Serbia, 2 participants from Estonia, 2 participants from Lithuania, 2 participants from Pakistan, 1 participant from Kosovo and 1 participant from Kazakhistan.

XI. IMCOFE organized with the main theme of “Trend Topics of the fields of science, technology and engineering in recent years”. We are proud to successfully complete this congress.

This book contains the full text and abstract texts of the papers presented at the congress. The fact that a significant portion of the participants are university undergraduate, graduate and doctoral students is important in terms of realizing the mission of our union.

Our mission will increasingly continue with the workshops, congresses and conferences to be held next year.

In 2020, when many congresses were postponed and canceled due to the pandemic, we held our congress without any problems, postponement or cancellation. This has been accomplished with the great effort of our members who take part in our union and organizing board. In the light of all these, I would like to thank our participants, the scientific and organizing board, our audience, our sponsors and our solution partners.

Dr. Christian Ruggiero
Conngress Chairman

A Study of the Reactions of [Au(ethylenediamine)Cl2]+ Complex with L-Histidine-containing Dipeptides. The Influence of N-Terminal Amino Acid on the Peptide Coordination

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Abstract

Purpose

Gold(III) complexes have attracted considerable attention of researchers worldwide due to their potential use in medicine as antitumor and/or antimicrobial agents. Their possible involvement in the treatment of cancer or microbial infections initiates an interest in investigation of the interactions of Au(III) complexes with different biologically important molecules, such as L-histidine-containing peptides.

Design / Methodology / Approach

The course of the reactions between [Au(en)Cl2]+ complex, in which en is bidentately coordinated ethylenediamine, with X-L-His dipeptides (X = Gly, L-Ala, L-Ser, L-Val and L-Leu) was investigated by time-dependent 1H NMR spectroscopy. All reactions were performed in aqueous solution at pD range 3.50 – 4.50 at ambient temperature, by mixing equimolar amounts of the reactants.

Findings

When [Au(en)Cl2]+ complex was incubated with an equimolar amount of X-L-His dipeptide (X = Gly, L-Ala, L-Ser, L-Val and L-Leu), three 1H NMR detectable Au(III)-dipeptide complexes 1 - 3 were observed in solution in the first 10 min. The final product in the investigated reactions was gold(III) complex of the general formula [Au(X-L-His-N,N',N'')Cl]+ (3), in which the corresponding L-histidine-containing dipeptide is tridentately coordinated to Au(III) ion through the nitrogen atom of the terminal amino group, the deprotonated amide nitrogen and the N3 nitrogen atom of imidazole ring. The other two complexes 1 and 2 were intermediate species. The complex 1 resulted from the monodentate coordination of the N3 imidazole nitrogen atom of the dipeptide to Au(III) ion, while in 2, the corresponding dipeptide is bidentately coordinated to Au(III) ion and form very stable six-membered chelate ring. The deprotonated amide nitrogen in 2 weakens the Au–N(en) bond in the trans position, leading to the displacement of the amino group of chelated en ligand by the amino group of N-terminal amino acid of the corresponding dipeptide. As a consequence of this substitution reaction, a release of en ligand from Au(III) ion in complex 2 was observed, yielding to the complex 3 as the final product in the investigated reactions. The suggested reaction pathway is favorable because the number of chelate rings increases and a bidentate ligand is being replaced by a tridentate ligand.

Originality / Value
The results obtained from this study could contribute to a better understanding of the quite complicated mechanism of reactions occurring between biologically active gold(III) complexes and biomolecules, including L-histidine-containing peptides and proteins.

Keywords: *Gold(Iii) Complexes, L-Histidine-Containing Dipeptides, Time-Dependant Nmr Spectroscopy*