

## Accepted Manuscript

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PII: S1386-1425(18)30616-4  
DOI: doi:[10.1016/j.saa.2018.06.074](https://doi.org/10.1016/j.saa.2018.06.074)  
Reference: SAA 16233

To appear in: *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*

Received date: 12 January 2018  
Revised date: 18 June 2018  
Accepted date: 20 June 2018

Please cite this article as: Jing Hao, Xiao-Yan Li, Lan Wang, Yang Zhang, Wen-Kui Dong, Luminescent and electrochemical properties of four novel butterfly-shaped hetero-pentanuclear  $[Zn_4Ln]$  complexes constructed from a bis(salamo)-type ligand. Saa (2018), doi:[10.1016/j.saa.2018.06.074](https://doi.org/10.1016/j.saa.2018.06.074)

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# Luminescent and electrochemical properties of four novel butterfly-shaped hetero-pentanuclear [Zn<sub>4</sub>Ln] complexes constructed from a bis(salamo)-type ligand

Jing Hao, Xiao-Yan Li, Lan Wang, Yang Zhang, Wen-Kui Dong\*

School of Chemical and Biological Engineering, Lanzhou Jiaotong University, Lanzhou, Gansu 730070, PR China

**ABSTRACT:** Four novel butterfly-shaped hetero-pentanuclear 3d–4f complexes [Zn<sub>4</sub>(L)<sub>2</sub>Sm(H<sub>2</sub>O)<sub>4</sub>]3NO<sub>3</sub>·2EtOH (1) [Zn<sub>4</sub>(L)<sub>2</sub>Eu(NO<sub>3</sub>)<sub>2</sub>(MeOH)(EtOH)]NO<sub>3</sub>·H<sub>2</sub>O (2), [Zn<sub>4</sub>(L)<sub>2</sub>Gd(H<sub>2</sub>O)<sub>4</sub>]3NO<sub>3</sub>·MeOH·EtOH (3) and [Zn<sub>4</sub>(L)<sub>2</sub>Tb(NO<sub>3</sub>)(EtOH)(H<sub>2</sub>O)<sub>2</sub>]NO<sub>3</sub>·MeOH·EtOH (4) were synthesized by the reactions of a bis(salamo)-type tetraoxime ligand (H<sub>4</sub>L) with Zn(OAc)<sub>2</sub>·2H<sub>2</sub>O and Ln(NO<sub>3</sub>)<sub>3</sub>·6H<sub>2</sub>O (Ln = Sm, Eu, Gd and Tb), respectively. The structures of complexes 1–4 were fully characterized by elemental analyses, FT–IR, UV–Vis spectroscopy and single crystal X-ray crystallography, and their luminescence properties were also discussed. In addition, cyclic voltammograms were used to characterize electrochemical properties of the Zn(II)–Ln(III) (Ln = Sm, Eu, Gd and Tb) complexes.

**Keywords:** Bis(salamo)-type ligand; Synthesis; Crystal structure; Luminescent property; Electrochemical property

## 1. Introduction

Currently, there is considerable interest to design and synthesize N<sub>2</sub>O<sub>2</sub>-donor metal complexes constructed from transition metal ions and salen-type [1] and salamo-type [2] ligands, since their potential application prospect in the preparation of novel materials such as biological systems [3] and molecular recognitions [4]. In consideration of their predominant functional properties in electrochemistries [5], supramolecular buildings [6] and catalysis fields [7], salen-type and

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\* Corresponding author.

E-mail address: dongwk@126.com (W.-K. Dong).

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