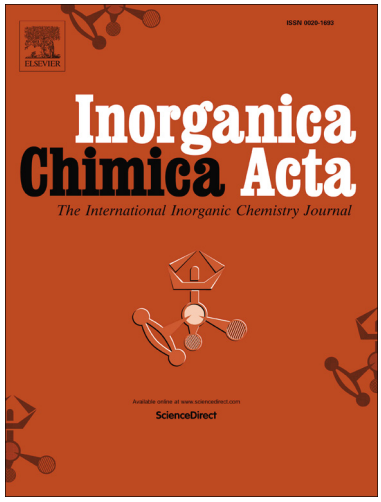

Research paper

A new off-on fluorescent sensor for the detection of Al(III) based on a chromone-derived Schiff-base

Li-mei Liu, Zheng-yin Yang

PII: S0020-1693(17)31104-0
DOI: https://doi.org/10.1016/j.ica.2017.09.051
Reference: ICA 17910

To appear in: *Inorganica Chimica Acta*

Received Date: 14 July 2017
Revised Date: 19 September 2017
Accepted Date: 20 September 2017

Please cite this article as: L-m. Liu, Z-y. Yang, A new off-on fluorescent sensor for the detection of Al(III) based on a chromone-derived Schiff-base, *Inorganica Chimica Acta* (2017), doi: https://doi.org/10.1016/j.ica.2017.09.051

A new off-on fluorescent sensor for the detection of Al(III) based on a chromone-derived Schiff-base

Li-mei Liu, Zheng-yin Yang*

College of Chemistry and Chemical Engineering, State Key Laboratory of Applied Organic Chemistry, Lanzhou University, Lanzhou 730000, P.R. China

**Corresponding author. Tel: +86 931 8913515; Fax: +86 931 812582; e-mail: yangzy@lzu.edu.cn (Z.Y. Yang)*

Abstract

A new Al^{3+} sensor, 6-ethoxychromone-3-carbaldehyde-(3-hydroxy-2-naphthalene acyl) hydrazone (L), was designed and synthesized. The sensor L could exist steadily and detect Al^{3+} in the pH range from 5.0 to 8.0 in ethanol and water (3:1, v/v). This sensor showed good selectivity and high sensitivity towards Al^{3+} in the presence of most metal ions, and a remarkable enhancement in fluorescence emission intensity at 508nm (λ_{ex}=420nm) was observed with addition of 1equiv Al^{3+}, which was attributed to the inhibition of photoinduced electron-transfer (PET) phenomenon and C=N isomerization process. With the fluorescence titration experiments and the ESI-MS spectrum data, we reached the conclusion that the binding ratio between L and Al^{3+} was 2:1. Besides, the binding constant (K_a) between L and Al^{3+} was calculated to be 9.24×10^3 M^{-1} and the detection limit of L for Al^{3+} was as low as 1.82×10^{-7}M.

Key Words: Fluorescent sensor; Aluminum ion; PET; C=N isomerization