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### Research paper

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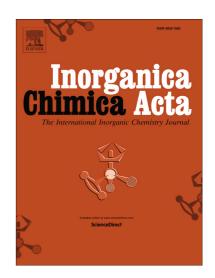
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### **ACCEPTED MANUSCRIPT**

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

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#### **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 ( $\lambda_{ex}$ =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  $9.24 \times 10^3 \, \text{M}^{-1}$  and the detection limit of L for  $Al^{3+}$  was as low as  $1.82 \times 10^{-7} \, \text{M}$ .

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

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