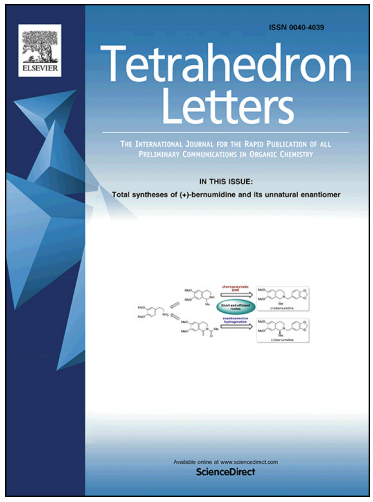

Synthesis of a new pyrene-devived fluorescent probe for the detection of Zn^{2+}

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Synthesis of a new pyrene-devived fluorescent probe for the detection of Zn^{2+}

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Abstract: A novel pyrene-based receptor bearing benzothiazole was synthesized as a good turn-on fluorescent sensor for the recognition of Zn^{2+}. The probe showed an excellent selectivity for Zn^{2+}over most other competing ions (eg, Cr^{3+}, Li^{+}, Cd^{2+}, Al^{3+}, Pb^{2+}, Li^{+}, Mg^{2+}, Ag^{+}, Ca^{2+}, Ni^{2+}, Mn^{2+}, Fe^{3+}, Hg^{2+}, Ba^{2+}, K^{+}, Na^{+}, Cu^{2+}, Fe^{2+}) in EtOH-HEPES (65:35, v/v, pH=7.20), which might be attributed to the photoinduced electron transfer (PET) mechanism. The formation of 1:1 stoichiometric **PBZ**-Zn^{2+} complex was determined based on the Job's plot, ^{1}H NMR titration and ESI-MS. The binding constant of the complex was 4.04×10^{4} M^{-1} with a detection limit of 2.58×10^{-7} M. The potential application of the **PBZ** in real water samples for recognizing Zn^{2+} was investigated. Bio-imaging study also revealed that **PBZ** could be applied to detecting Zn^{2+} in live cells. These results indicated that **PBZ** could be a favorable probe for Zn^{2+}.

Keywords: Zn^{2+}detection, pyrene, turn-on fluorescence, live cells

Introduction

Zinc ion, as the second abundant metal ion in the human body after Iron, plays crucial roles in many biological processes including gene expression, cell growth, cell division, cellular metabolism, DNA replication and repair [1-4]. Both the deficiency

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