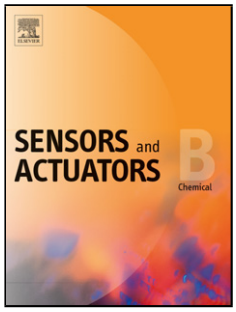

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PII: S0925-4005(15)30738-3
DOI: http://dx.doi.org/doi:10.1016/j.snb.2015.12.016
Reference: SNB 19417

To appear in: *Sensors and Actuators B*

Received date: 9-9-2015
Revised date: 8-12-2015
Accepted date: 9-12-2015

Please cite this article as: S. Zhang, H. Yang, Y. Ma, Y. Fang, A Fluorescent Bis-NBD Derivative of Calix[4]arene: Switchable Response to Ag^+ and HCHO in Solution Phase, *Sensors and Actuators B: Chemical* (2015), http://dx.doi.org/10.1016/j.snb.2015.12.016

A Fluorescent Bis-NBD Derivative of Calix[4]arene: Switchable Response to Ag^+ and HCHO in Solution Phase

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Abstract:

A bis-nitrobenzoxadiazole (NBD) derivative of calix[4]arene (L_1) and a control compound (L_2), mono-NBD derivative of the calixarene were designed and prepared via click chemistry. Fluorescence studies demonstrated that L_1 as created can function as a switch with the presence of Ag^+ in THF, of which the free state of L_1 emits at ~527 nm, but the binding state at 576 nm. Based upon this discovery, L_1 was studied as a chemo-sensor of Ag^+ in a mixture solvent of THF and H_2O with a detection limit (DL) of ~6.2×10^{-7} mol/L. Presence of other commonly found metal ions shows little effect upon the determination. Moreover, the L_1 in the Ag^+-L_1 complex could be fully released with introduction of HCHO, a bases for the sensitive and selective detection of the toxic chemical. The DL of this test is 6.6×10^{-7} mol/L. Interestingly, binding and releasing of the fluorescent ligand could be repeated for at least 5 times. Furthermore, both sensing could be performed in a visualized manner. It is believed that the fluorescent compound as created should have a potential to find real-life applications.

Keywords: NBD; Calix[4]arene; Ag^+; HCHO; Fluorescent Switch

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