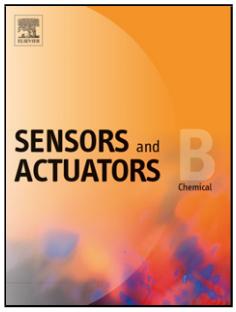

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The multistage amplifying effect: a novel approach to dramatically increase the sensitivity of chemodosimeter

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Abstract: Through the multistage amplifying effect, a new Hg^{2+} chemodosimeter, 4-(2-(4-nitrobenzyl)-1,3-dithiolan-2-yl)-*N,N*-diphenylaniline, is designed according to a relay strategy, which combines the advantages of two simple reactions: the high selectivity of the Hg^{2+}-promoted deprotection reaction and the obvious color change caused by ketone-enol isomerization. Once triggered by Hg^{2+}, immediate color change from colorless to red purple can be observed in the solution of this chemodosimeter *via* naked-eye without any additional equipment, while other metal ions (Cr^{3+}, Al^{3+}, Fe^{3+}, Co^{2+}, Pb^{2+}, Cu^{2+}, Zn^{2+}, Fe^{2+}, Mg^{2+}, Mn^{2+}, Cd^{2+}, Ba^{2+}, Ca^{2+}, Ni^{2+}, Li^{+}, Na^{+}, K^{+} and Ag^{+}) give no disturbance to the sensing process. Furthermore, the probe molecule can be easily fabricated as test strips, which can store for a long time with the detection limit as low as 1 μM.

Keywords: Multistage amplifying effect, Relay strategy, Mercury Ions, Chemodosimeter, Sensitivity