

Synthesis a new fluorescent biosensor for Hg^{2+} by using perylene bisimide derivative containing calix[4]arene units (PB-CX[4])

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The sensing and recognition of the biologically and environmentally important metal ions has emerged as a significant goal in the field of chemical sensors. In that study, we have designed and synthesized a new perylene bisimide derivative containing calix[4]arene units (PB-CX[4]) as “turn on” fluorescent sensor for Hg^{2+} ion determination. PB-CX[4] showed highly selective and sensitive “turn-on” fluorescent responses toward Hg^{2+} ion based on photoinduced electron transfer (PET) mechanism in DMF/ H_2O (v/v, 95/5). The binding analysis using a Job plot suggested that PB-CX[4] formed a 1:2 complex with Hg^{2+} . The association constant (K) of PB-CX[4]– Hg^{2+} complex was found to be $1.66 \times 10^9 \text{ M}^{-2}$, with a detection limit of $5.56 \times 10^{-7} \text{ M}$. In addition, possible utilization of PB-CX[4] as bio-imaging fluorescent probe to detect Hg^{2+} in human colon cancer cell lines was also observed by confocal fluorescence microscopy.

