

OFF-ON chemosensors based on Rhodamine B for Al^{3+} and Hg^{2+} with Novel Functionalized $\text{Fe}_3\text{O}_4/\text{SiO}_2$ nanoparticle

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From the Rhodamine B, two novel [1 and 2] fluorescent "off-on" chemosensors were designed and synthesized for selectively sensing of cations. A Novel Al^{3+} specific "off-on" fluorescent chemosensor 1 of pyridine amphiphile Rhodamine B was prepared, based on the equilibrium between the spirolactam and the ring-opened amide. The 1 showed high Al^{3+} -selective absorbance and fluorescence enhancement over commonly coexistent metal ions in CH_3CN . And also the coordination mode with 1:1 stoichiometry was proposed between 1 and Al^{3+} . It was also demonstrated that the 1 could be used as an excellent "off-on" fluorescent chemosensor for the measurement of Al^{3+} in HeLa cells with satisfying results. The chemosensor 2 has been functionalized with $\text{Fe}_3\text{O}_4@\text{SiO}_2$ core/shell magnetic nanoparticles. The core was composed of superparamagnetic Fe_3O_4 nanoparticles, while the shell consisted of silica and was functionalized by novel rhodamine derivative. The obtained 2 was confirmed by XPS and TGA. The Rhodamine B functionalized- $\text{Fe}_3\text{O}_4@\text{SiO}_2$ core/shell magnetic nanoparticles have been removed and selectively sense the Hg^{2+} cation in CH_3CN medium.