

Towards the creation of turn-on fluorescent Schiff base probes for hydrogen sulfide detection

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Hydrogen sulfide (H_2S) is a toxic gas with the odor of rotten eggs and is mainly known to occur as a natural gas. In addition, H_2S is hypothesized to be the third endogenous gaseous transmitter after carbon monoxide (CO) and nitric oxide (NO), with many unexplored signaling functions in the human body. Because of its many unknown roles in the body, the creation of sensitive H_2S probes is beneficial in order to explore H_2S functions. Based on our prior creation of a turn-off fluorescence Schiff base sensor for the sensitive detection of cyanide (CN^-), similar probes were synthesized by reacting Disperse Orange 3 and 4-Nitrobenzaldehyde to form one probe and 1,5-Diaminonaphthalene and 4-Nitrobenzaldehyde to form a second probe. Aqueous H_2S reduces the nitro groups on both of the probes to primary amine groups, causing turn-on fluorescence. Both probes were characterized with $^1\text{H-NMR}$, and the process of optimizing solvent ratio, fluorescence excitation wavelength, and incubation time and temperature was carried out with the first probe. Likely due to a small Stokes' shift and the interference between the excitation beam and emission, the fluorescence output of the first probe did not directly correlate to the $[\text{H}_2\text{S}]$ as was expected. The process of optimizing the fluorescence response in both probes is currently in progress.

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