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“On-Off-On” Fluorescence Sensor Based on g-C₃N₄ Nanosheets for Selective
and Sequential Detection of Ag⁺ and S²⁻

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Abstract:

Detection of silver (Ag⁺) and sulfide (S²⁻) ions is important because their presence in large amounts can cause many diseases. In this study, a novel, simple, “on-off-on” fluorescence sensor based on g-C₃N₄ nanosheets for sequential detection of Ag⁺ and S²⁻ was designed. The fluorescence signal of the g-C₃N₄ nanosheets is quenched because Ag⁺ chelates with the N of the g-C₃N₄ nanosheets, leading to photoinduced electron transfer from the sheets to Ag⁺. After adding S²⁻, the fluorescence of the g-C₃N₄ nanosheets is recovered due to formation of Ag₂S, which activates the fluorescence of the g-C₃N₄ nanosheets. The recovery efficiency was found to increase with increasing concentrations of S²⁻, with linear calibration ranging from 0 nmol/L to 30 nmol/L. Other potentially interfering species, such as SO₄²⁻, PO₄³⁻,

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