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Novel S, N-doped carbon quantum dot-based "off-on" fluorescent sensor for silver ion and cysteine

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Abstract

In this work, sulfur and nitrogen co-doped carbon dots (S,N-CQDs) as highly selective fluorescent probe for silver ion (Ag^+) and cysteine (Cys) detection were designed and synthesized directly from citric acid and thiamine hydrochloride *via* a one-step hydrothermal protocol in 63.8% quantum yield. This probe enabled selective detection of Ag^+ with a linear range of 0-10 and 10-250 μM and a limit of detection of 0.40 μM with respect to the variation in fluorescence induced by target concentration and electron-transfer from S,N-CQDs to Ag^+ . Furthermore, S,N-CQDs/ Ag^+ fluorescence can be effectively recovered by virtue of a specific reaction of Cys with silver ion. This fluorescence "turn-on" protocol was applied to determine Cys with two linear ranges of 0-10 and 10-120 μM as well as a detection limit of 0.35 μM . The

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