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One-pot synthesis of bovine serum albumin protected gold/silver bimetallic nanoclusters for ratiometric and visual detection of mercury

Rui Dai [a], Wenqing Deng [a], Pingyue Hu[a], Chao You [a], Lu Yang[a], Xue Jiang [a], Xiaoli Xiong [a,b]* and Ke Huang [a,]*

[a] College of Chemistry and Material Science, Sichuan Normal University, Chengdu, Sichuan, 610068, China

[b] Key Lab of Process Analysis and Control of Sichuan Universities, Yibin University, Yibin, Sichuan, 644000, China

∗ *Corresponding author*

E-mail addresses: xiongxiaoli2000@163.com (X. Xiong) and huangke@sicnu.edu.cn (K. Huang)

Abstract

A novel, rapid and ultrasensitive ratiometric and colorimetric fluorescence method was developed using bovine serum albumin protected gold/silver bimetallic nanoclusters (BSA-Au/Ag NCs) as fluorescent sensor for mercury (Hg) detection. The fluorescence sensor which was synthesized by one-pot approach shows dual-emissions at 470 nm (Ag NCs) and 630 nm (Au NCs) under a single excitation at 390 nm. In the presence of Hg^{2+}, the red fluorescence of Au NCs was quenched while the fluorescence of Ag NCs almost unchanged, which exhibited a ratiometric fluorescence response and an obvious fluorescence color change toward Hg^{2+}. The selective quenching mechanism may be due to the formation of gold amalgam bonds