Na^+ detection via brightening of synergistically originated noble metal nanoclusters

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Materials and instruments

Without further purification, all of the chemicals employed in the studies were of analytical grade. Triple-distilled water was employed during the entire project. All glassware was cleaned using freshly made aqua regia, followed by soapy water and lots of distilled water. Before usage, the glassware had been thoroughly dried. All metal salts including silver nitrate, Chloroauric acid, and GSH were purchased from Sigma Aldrich.

Using a digital spectrophotometer called the Shimadzu UV-2600, all UV/Vis absorption spectra were captured. A Horiba FluoroMax-4 spectrometer was used to analyse the fluorescence at room temperature. The JEOL Make JSM-7610FPlus FESEM at SAIF, a high resolution (1 KV 1.0nm, 15 Kv 0.8nm) with wide range of probe scanning electron microscope, was used to analyse particle morphology. Prior to performing the FESEM experiment, samples were vacuum dried for 24 hours. For microscopic examination, the water suspension was dried on carbon tape. Atomic absorption Shimadzu AA-7000F was also used to assess the amount of iron in natural water (double beam optics with high sensitivity and flexibility). The Xevo G2-S Q Tof mass spectrometer (Waters, USA) and the JSM-7610F chamber are equipped with EDAX Energy Dispersive X-ray (EDS) detectors. Xevo G2-S Q Tof mass spectrometer liquid chromatography-mass spectra were taken.

Synthesis of AuAg@GSH

In a 20 mL screw-capped test tube, 2 mL of 0.001 M $HAuCl_4$ (in triple distilled water), 2 mL of 0.001 M $AgNO_3$ (in triple distilled water), 2 mL of 0.01M GSH (in triple distilled water), and 3.5 mL of triple distilled water were added. The screw-capped test tube was exposed to a 100 W bulb (Philips India) for 6 hours, resulting in intense fluorescent light. The distance between the bulb and the test tube was set at 3 cm. The system was stored in a 1 ft x 1ft x 1 ft closed wooden box.

Synthesis of NaAuAg@GSH

1 mL of sodium chloride (0.01M) was added to the fluorescent cluster (AuAg@GSH) (1 mL)and 2 mL of tripled distilled water was added and aged for 6 hours under dark light.

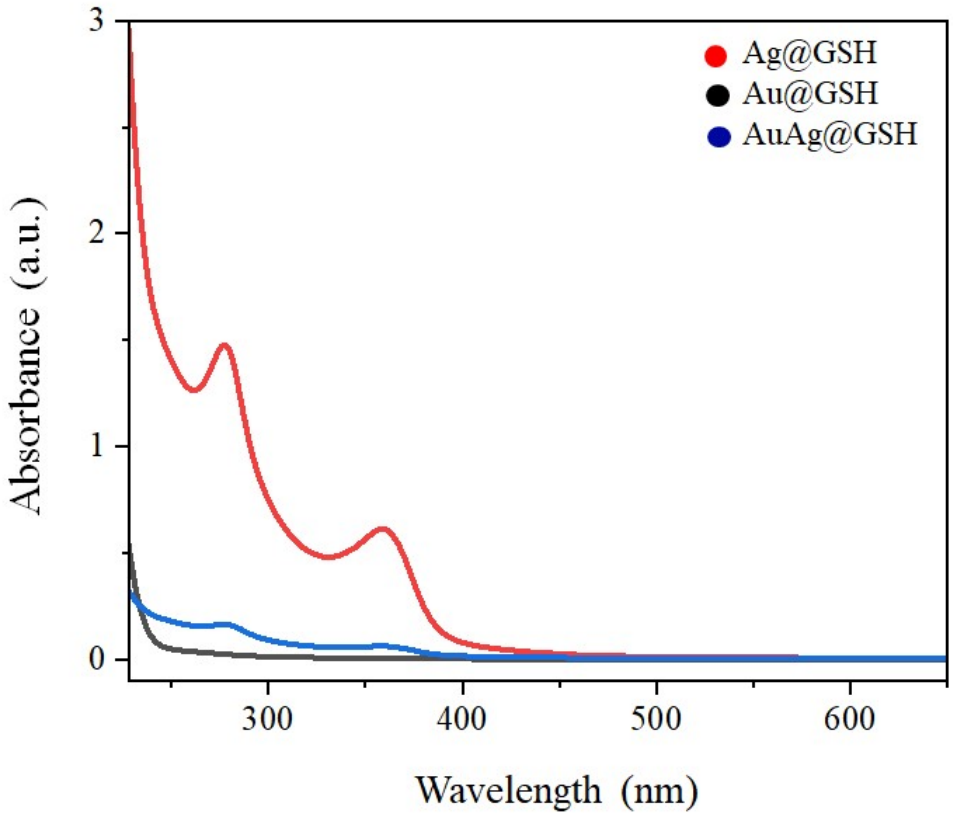

Fig. S1: UV Spectra of (a) Ag@GSH (b) Au@GSH, and (c) AuAg@GSH

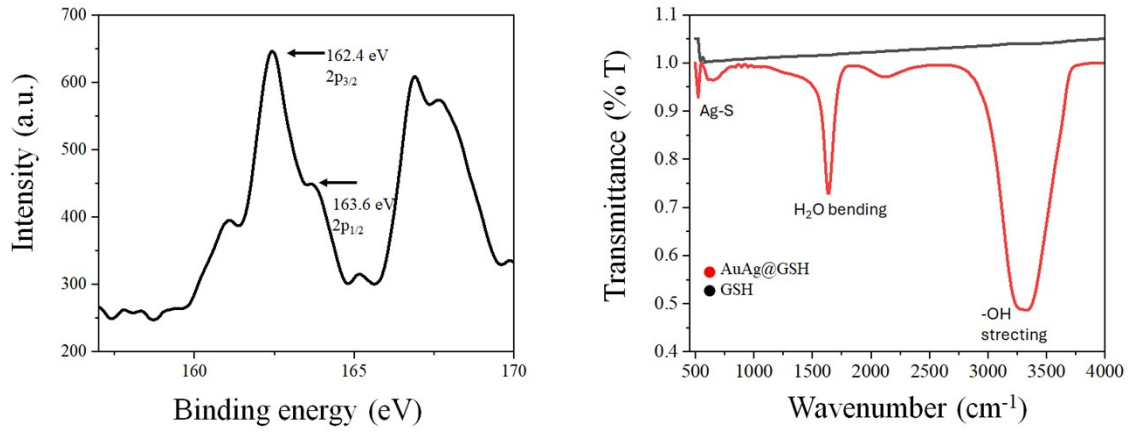

Fig.S2: XPS spectra of AgAu@GSH for the element of sulfur; (b)IR spectra of GSH solution and AuAg@GSH

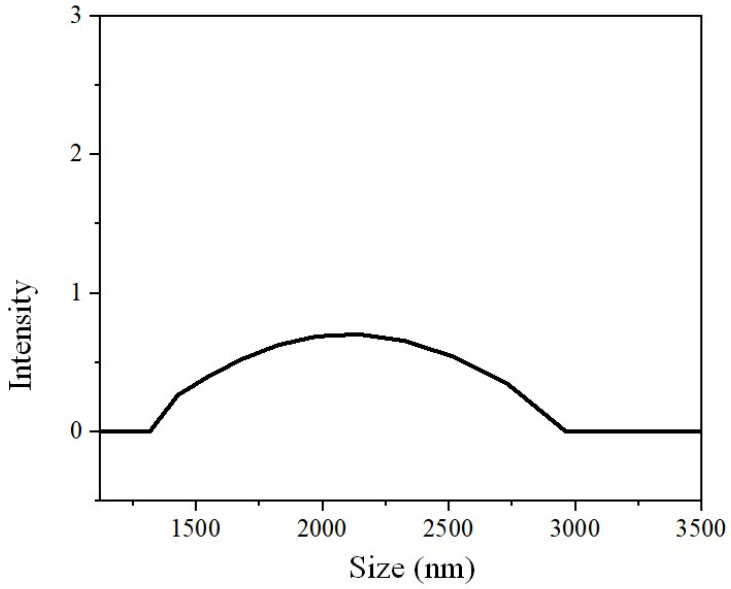

Fig.S3: DLS spectra of AuAg@GSH

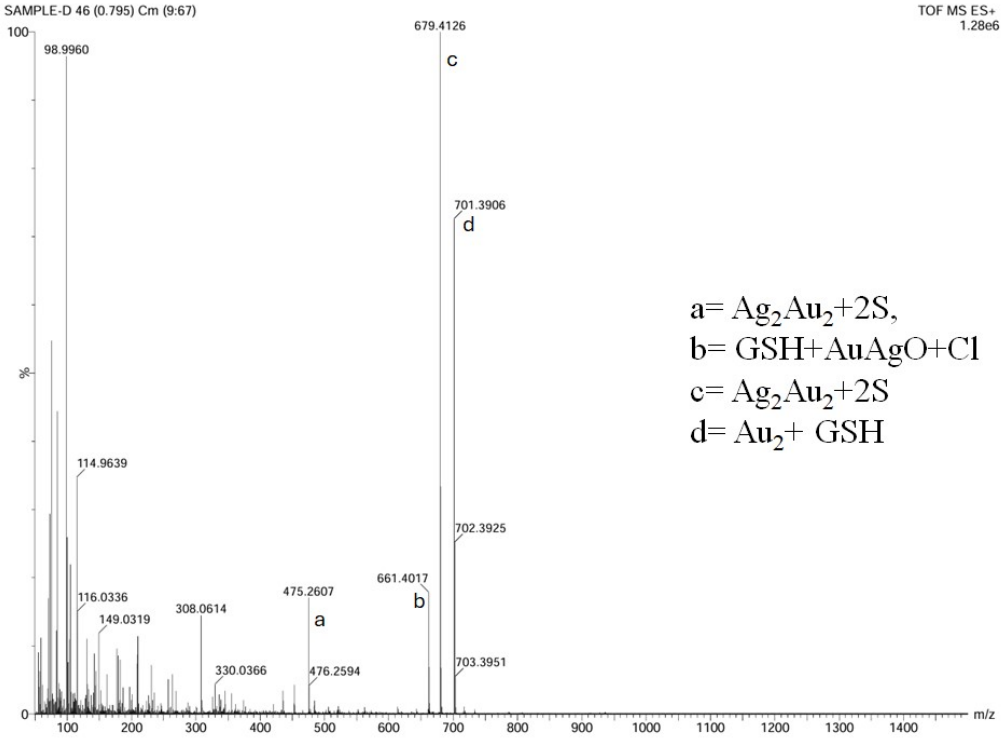

Fig. S4: LCMS spectra of AuAg@GSH

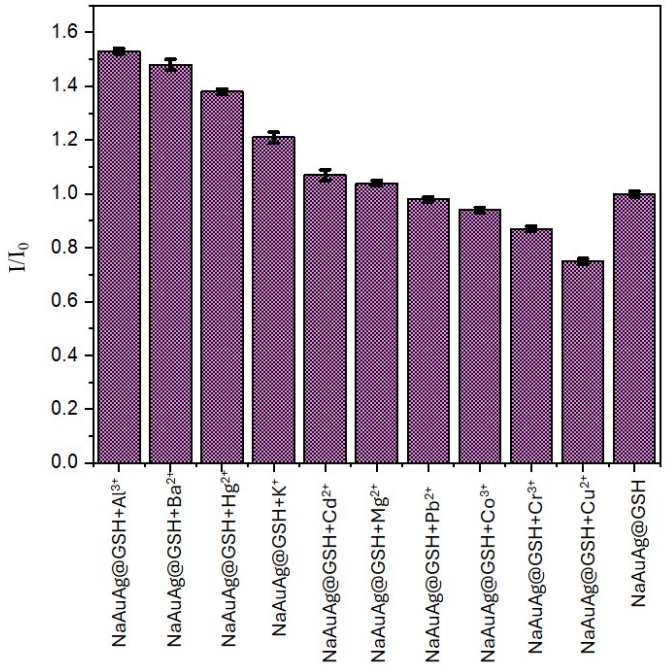

Fig. S5: Interfering Bar diagram of NaAuAg@GSH with different metal ion.

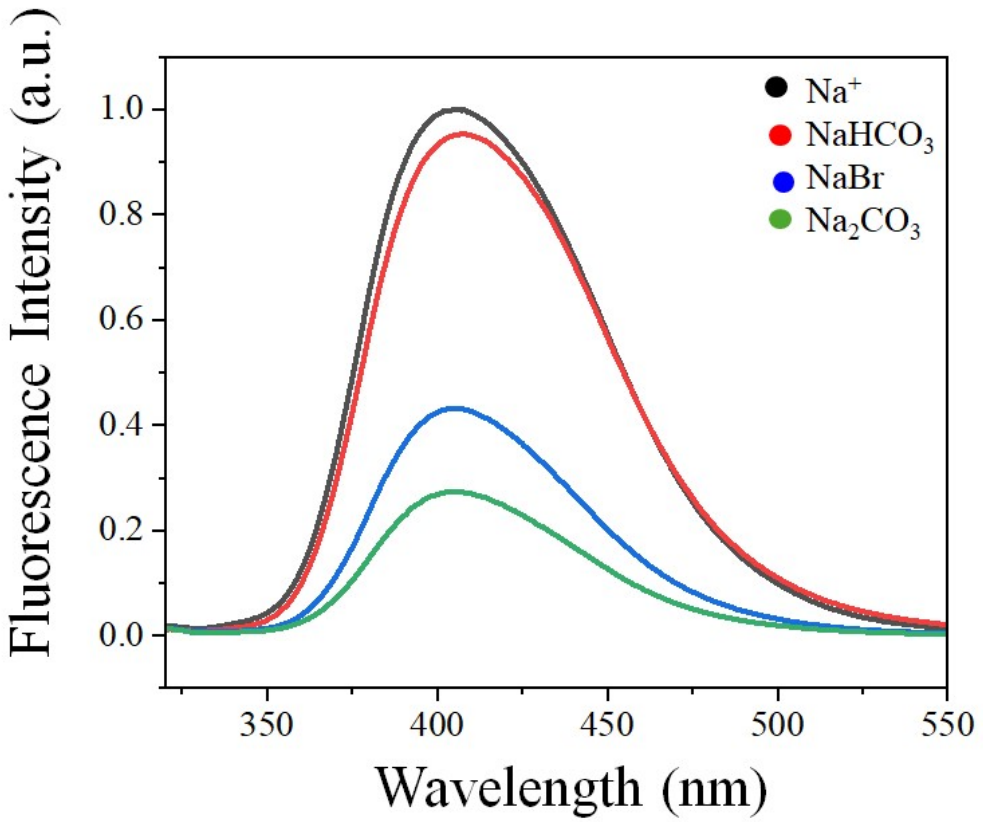

Fig. S6: Effect of counter ions of sodium on fluorescence for NaAuAg@GSH