**Nanosensors based on structural memory carbon nanodots for Ag+ fluorescence determination**

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**Cytotoxicity test**: Human uterine cancer cell (HeLa) was seeded into 96-well plates with Dulbecco's modified Eagle's medium (DMEM) for 24 h at a density of 104 cells/150 μL in an incubator (37 °C, 5% CO2). And the culture medium was replaced DMEM containing CSM-dots of different concentrations (0, 0.05, 0.1, 0.25, 0.5, 0.75 mg/mL) for another 24 h. Then, the cells were washed by 20 mL PBS buffer (pH 7.4) and incubated with MTT solution (5 mg/mL) for 4 h. After that, the culture medium was removed, followed by the addition of 150 μL DMSO and shaken for 10 min at room temperature. The optical density (OD) was measured by a microplate reader (ELx800, Biotek, USA) at 490 nm. The cell viability was estimated according to the following equation:

Cell viability (%) = (ODtreated/ ODcontrol) × 100%

where ODtreated was obtained in the presence of LGQDs, and ODcontrol was obtained in the absence of CSM-dots.

**Cellular imaging analysis**: The HeLa was first cultured in DMEM containing 10% fetal bovine serum (FBS) and 1% penicillin/streptomycin at 37 °C in 5% CO2 for 12 h, followed by incubation with CSM-dots (0.5 mg mL−1) for another 6 h. Then, the cells were washed with Dulbecco's phosphate buffer saline (DPBS) three times (1.0 mL each) to remove the CSM-dots. The Hela cells were harvest by fixed with 4% paraformaldehyde solution in DPBS at 4 °C for 30 min. The cellular imaging of the treated cells was performed on a Nikon Eclipse 90i microscope equipped with the Cool SNaP HQ2 CCD camera (Photometrics, AZ).



**Fig. S1** (a) The high-resolution XPS spectra of O 1s in CSM-dots. (b) TEM image of CSM-dots. (c) Size distribution of CSM-dots. (d) XRD pattern of CSM-dots.



**Fig. S2** The effect of different pH value on the FL performance of CSM-dots.



**Fig. S3** FL intensity variation of the CSM-dots as a function of temperature (a) and concentrations of NaCl (b).

**Table S1** Comparison of the reported probe for Ag+ determination.

|  |  |  |  |
| --- | --- | --- | --- |
| **Precursor** | **Linear range (μM)** | **Detect limit (nM)** | **Ref.** |
| Pyrrolo[2,1-a]isoquinoline | 0-30 | 600 | [1] |
| 1,2,4-Triaminobenzene | 0-30 | 660 | [2] |
| Polyurethane foam | 0-6 | 2800 | [3] |
| azidoimidizole | 0-20 | 480 | [4] |
| Bis(5,6-dimethylbenzimidazole) | 0-100 | 423 | [5] |
| Lignin | 5-290 | 500 | This work |



**Fig. S4** (a) FL decay spectra of CSM-dots and CSM-dots/Ag+ system. (b) The TEM image of CSM-dots /Ag+ composites.



**Fig. S5** The fluorescence microscopy images of HeLa cells treated with CSM-dots, (a) the bright-field images, (b) the fluorescent images, (c) the merged images of (a) and (b).

**References**

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