Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information

Homogeneous and high-density gold units implanted optical labels for robust and sensitive point-of-care drug detection

Liang Huang, ‡[a] Jiening Jin, ‡[a] Jing Wang,[a] Chenxing Jiang,[a] Meng Xu,[a] Huimin Wen,[a] Tao Liao*[b] and Jun Hu*[a]

[a]College of Chemical Engineering, Zhejiang University of Technology, Hangzhou 310014, P.R. China

[b]Shenzhen WWHS Biotech. Inc, Shenzhen 518100, P.R. China

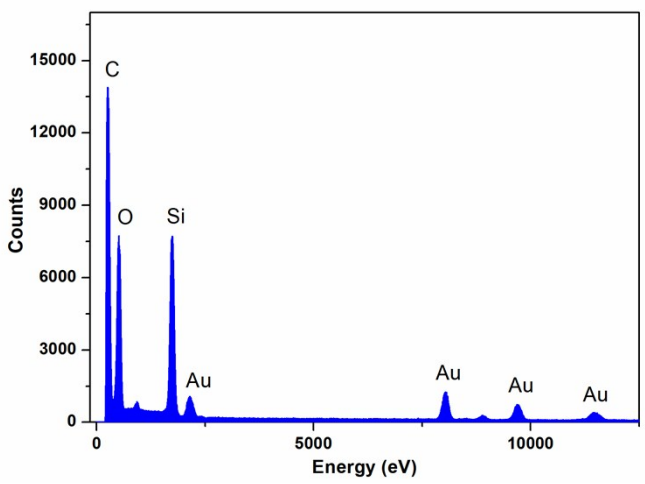

Fig S1. The EDS spectrum of SAS nanospheres.

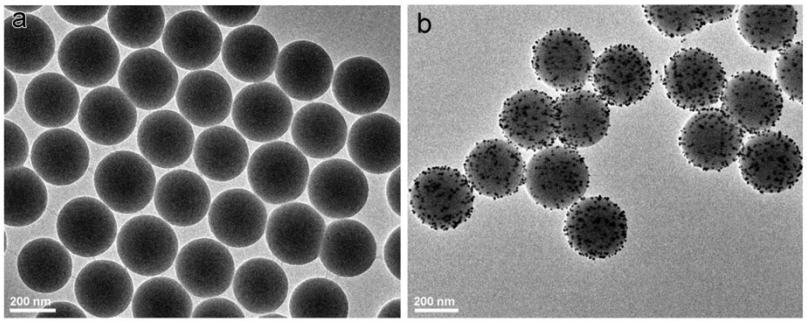

Fig S2. TEM images of spherical nonporous SiO_2 templates (a) and their assembly structures with hydrophobic AuNPs (b).

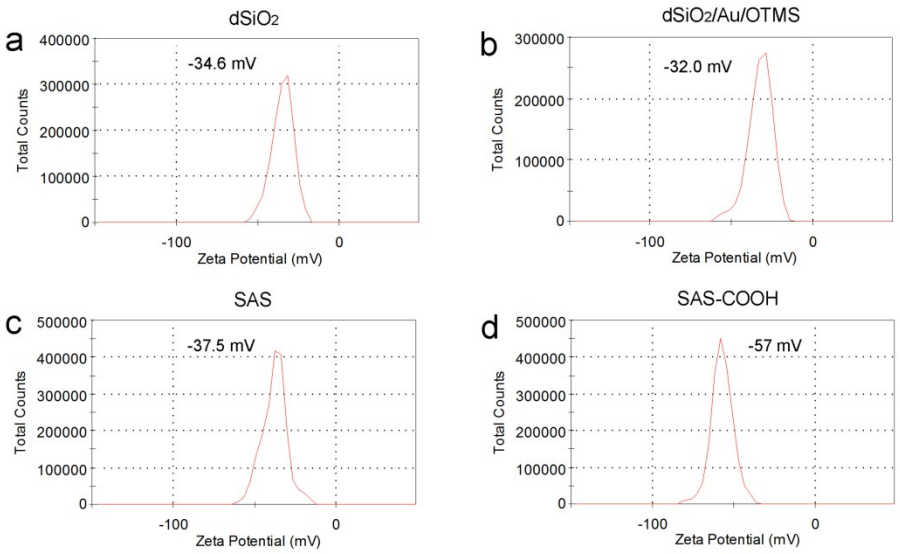

Fig S3. The zeta potential distributions of $dSiO_2$ (a), $dSiO_2$/Au/OTMS (b), SAS (c), and SAS-COOH (d) nanospheres.

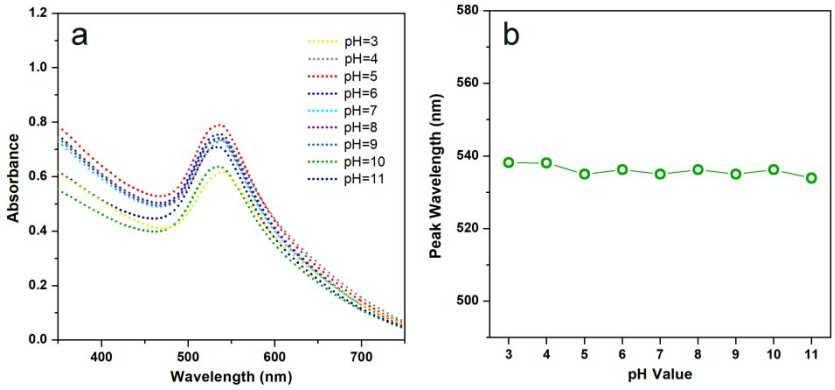

Fig S4. The UV-vis absorption spectra (a) and maximum absorption wavelengths (b) of SAS-COOH water dispersions with various pH values.

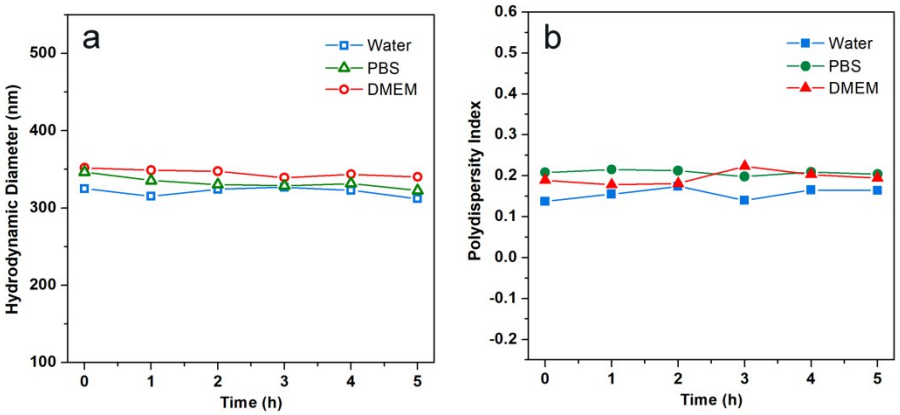

Fig S5. The hydrodynamic diameter (a) and polydispersity index (b) variations of SAS-COOH dispersed in water, PBS and Dulbecco's Modified Eagle Medium (DMEM) along with the incubation time.

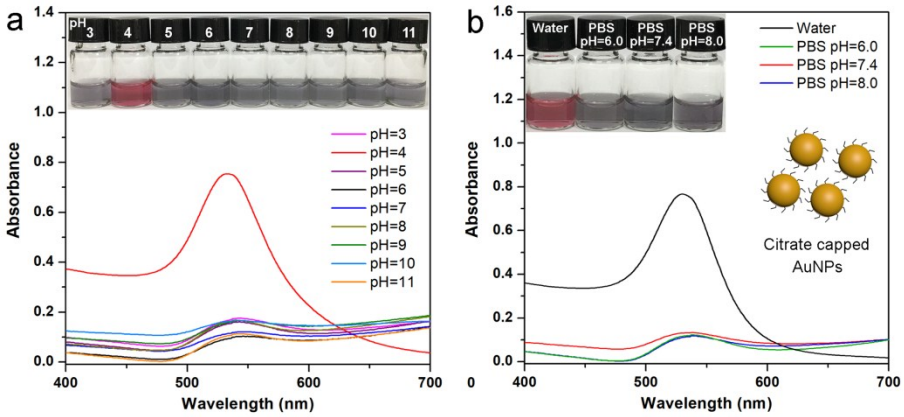

Fig S6. UV-vis absorption spectra of citrate capped AuNPs water dispersions under various pH values (a) and citrate capped AuNPs dispersed in water and PBS with various pH values (b). Insets show the photographs of the corresponding dispersions, respectively.

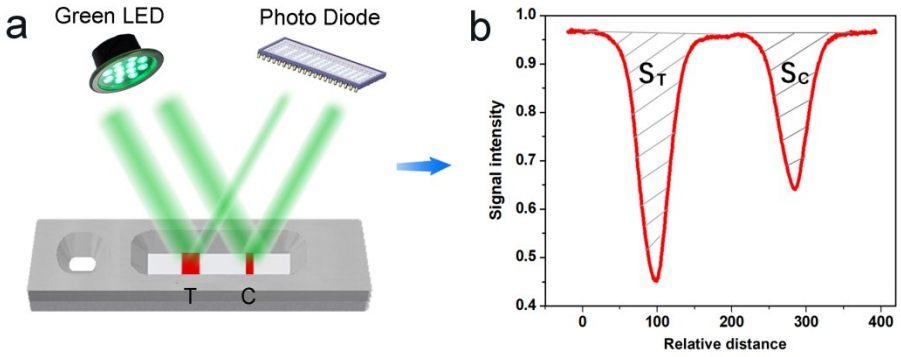

Fig S7. a) The detection principle of the portable optical scanner for SAS-based lateral flow immunoassay strip using off-axis mode. b) A representative scanning curve for the signals on the test line (S_T) and control line (S_C) from an immunoassay strip.

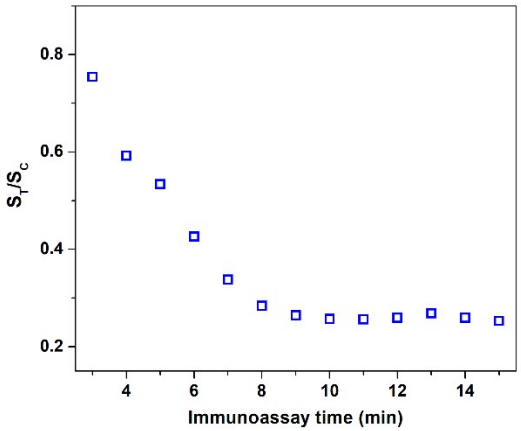

Fig S8. Relationship of S_T/S_C value against immunoassay time of SAS-based LFIA for MET urine sample (187.5 ng mL^{-1}) detection.

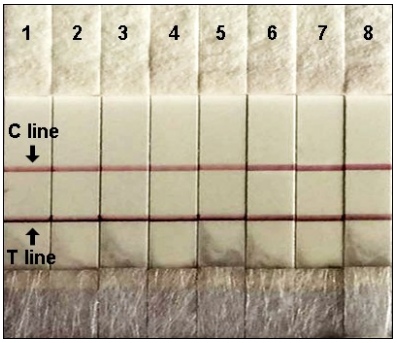

Fig S9. Photograph of the immunoassay strips using citrate capped AuNPs as optical labels with the addition of different concentrated MET in urine (1-8: 0, 0.023, 0.045, 0.09, 0.18, 0.36, 0.72, 1.44 ng mL^{-1}).

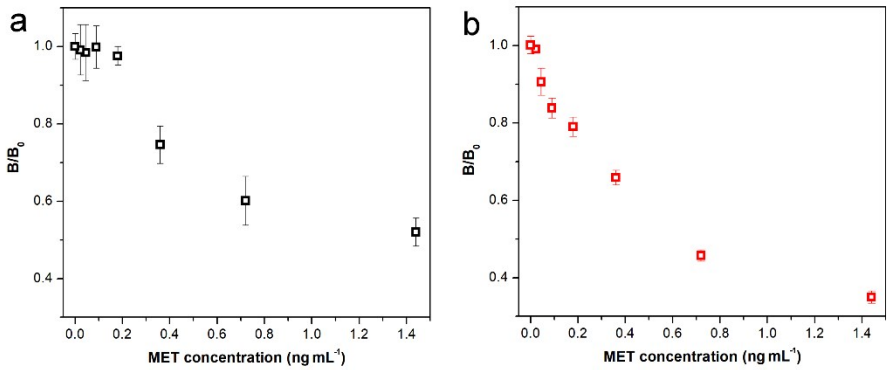

Fig S10. Relationship of the signal to MET concentration (0, 0.023, 0.045, 0.09, 0.18, 0.36, 0.72, 1.44 ng mL^{-1}) using citrate capped AuNPs (a) and SAS (b) as optical labels for lateral flow immunoassay, respectively. Where B represents the S_T/S_C value and B_0 represents the S_T/S_C value without MET addition.

Table S1. A summary of the analytical parameters for detection of MET urine samples by different methods

Method	Limit of detection	Sample pretreatment	Assay time	Reference
SHS-HLLME/GC-MS	1.82 ng mL^{-1}	extraction	unknown	47
MISPE-DLLME/GC-FID	2 ng mL^{-1}	extraction	unknown	48
In-tube SPME/HPLC-UV	4 ng mL^{-1}	extraction	25 min	49
Colorimetric assay	122.37 ng mL^{-1}	no need	20 min	50
ILBF-sensing paper	50 ng mL^{-1}	extraction	unknown	51
On-spot SERS detection	100 ng mL^{-1}	extraction	unknown	52
Liquid interfacial SERS detection	0.5 μg mL^{-1}	extraction	unknown	53
Bioelectrochemical method	13.07 μg mL^{-1}	no need	30 min	54
SAS-based lateral flow test strip	0.026 ng mL^{-1}	no need	10 min	current method

Table S2. Reproducibility analysis of SAS-based LFIA for MET detection

MET concentration in urine (ng mL^{-1})	mean	SD	CV
0.18	3.542	0.234	6.61%
6.25	1.126	0.067	5.95%
187.5	0.257	0.013	5.06%

The "mean" value represents the average of S_T/S_C values for parallel tests (n = 6). The SD value represents the standard deviation for parallel tests (n = 6). CV = SD/mean.