Supporting information

Ni@Au Nanoparticles for Surface Enhanced Raman Spectroscopy Based Ultrasensitive Magnetic Immunoassay on Aflatoxin B1

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1. Elemental analysis of EDAX

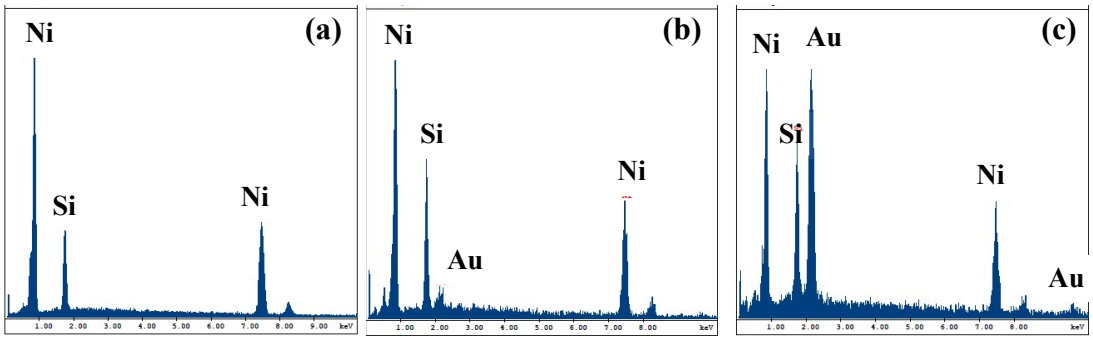

Figure S1 EDAX images of Ni nanoparticles (a), Ni-Au seeds (b), and Ni@Au nanoparticles(c), respectively.

2. (a) Optimization of experimental conditions for SERS-immunoassay with immune Fe_3O_4@Au

It indicated that the optimal ratio was 1:1 (spectrum 1).

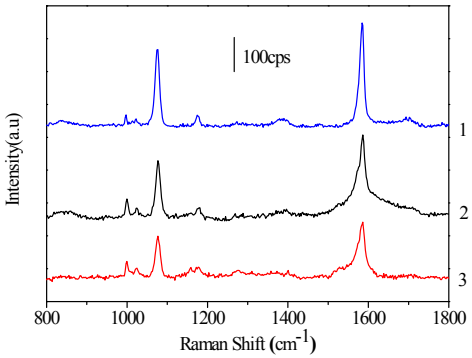

Figure S2 The SERS spectra of samples with different volume ratios (immune-magnetic beads vs. labeled immunoassays gold) (1) 1.0:1.0; (2)1.0:0.5; (3)1.0:1.5

(b) Competitive immunoassay of AFB_1 based on SERS by using immune Fe_3O_4@Au

From the fitted curve (Figure S4), one estimated that the IC_{50} was 0.10 pg·mL^{-1}.

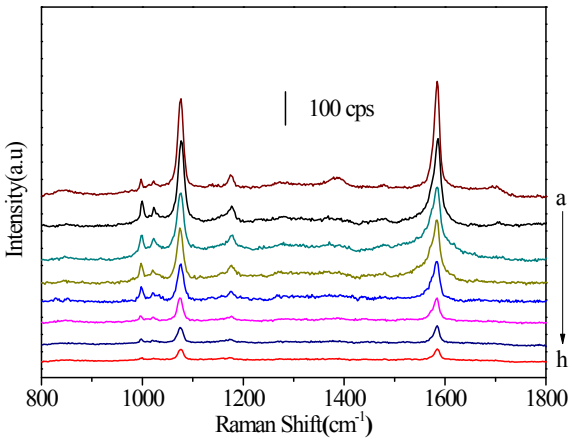

Figure S3 SERS spectra of immunoassay for AFB_1 with different concentrations：（a-h: 0; 1 fg·mL^{-1}; 10 fg·mL^{-1}; 100 fg·mL^{-1}; 1 pg·mL^{-1};10 pg·mL^{-1}; 100 pg·mL^{-1};1 ng·mL^{-1}.）

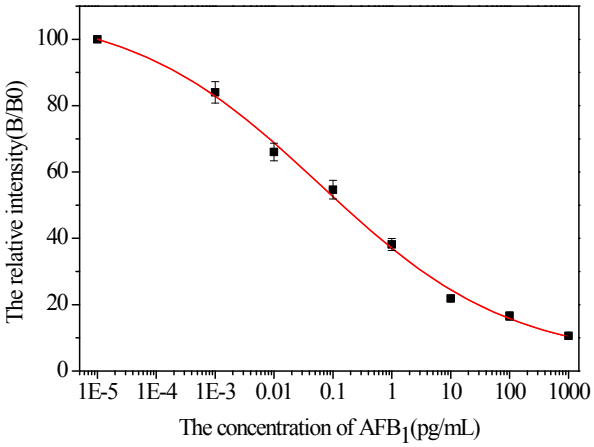

Figure S4 Calibration cure with the plot of band intensities at 1584 cm^{-1} as the function of the logarithm of AFB_1 concentrations. Notes: This is the result of the three experiments.

3. LC-MS measurements on the AFB_1 and the calibration curve

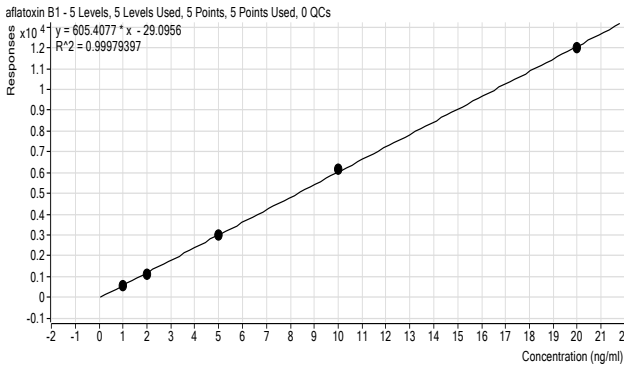

Figure S5 The calibration curve of LC-MS detection for AFB_1 (1-20 ng·mL^{-1})

4. The process of detection on AFB_1 in maize:

The maize meal was homogenized and dilution to prepare maize juice. Typically, different concentrations of AFB_1 solutions were added to 4 mL of maize juice for preparing AFB_1 contained maize solutions. Then, these maize juice were centrifuged at 5000 r•min^{-1} for 20 min. Then the solid material was removed by centrifugation, and the supernatant was diluted for testing. 0.1 mL of the supernatant was extracted and diluted to 0.5 mL to ensure the final concentration was 1 fg•mL^{-1}, 10 fg•mL^{-1}, 100 fg•mL^{-1}, 10 pg•mL^{-1},respectively. The final samples were tested by competitive magnetic immunoassay based on SERS. As for establish standard curves, we can obtain the concentrations of AFB_1 through multistage dilution of the samples.