

## **Supporting Information**

**Fig. S1** SERS Spectral curve of 0.3mM thiram on apple surface enhanced by Au@Ag NRs. Red curve is a pristine spectrum while blue curve is the filtered spectrum after Fast Fourier Transform and Bandpass filter background pretreatment.



Fig. S 2 (a) Concentration-dependent SERS spectra and (b) dose-response curve of thiram using Au@Ag NRs as substrate. Inset is the partial enlargement of data points from 1.3×10<sup>-6</sup>M to blank on horizontal axis. (The LOD of thiram in Au@Ag NRs is ~1.5×10<sup>-7</sup>M)



**Fig. S 3** (a) Concentration-dependent SERS spectra and (b) dose-response curve (at 675 cm<sup>-1</sup>) of methamidophos (MTD) using Au@Ag NRs as substrate. Inset is the partial enlargement of data points from 1.1×10<sup>-4</sup>M to blank on horizontal axis. (The LOD of MTD in Au@Ag NRs is ~6.8×10<sup>-6</sup>M)



Fig. S 4 (a) Concentration-dependent SERS spectra and (b) dose-response curve of thiram using GNRs as substrate. Inset is the partial enlargement of data points from  $1.3 \times 10^{-6}$ M to blank on horizontal axis. (The LOD of thiram in GNRs is ~4.6×10<sup>-7</sup>M)



**Fig. S 5** (a) Concentration-dependent SERS spectra and (b) dose-response curve (at 675 cm<sup>-1</sup>) of methamidophos (MTD) using GNRs as substrate. (The LOD of MTD in GNRs is ~8.8×10<sup>-4</sup>M)



Fig. S 6 (a) Concentration-dependent SERS spectra and (b) dose-response curve of thiram on apple peels using GNRs as substrate. Inset is the partial enlargement of data points from  $4 \times 10^{-6}$ M to blank on the horizontal axis. (The LOD of thiram on apple by enhancement of GNRs is  $1.2 \times 10^{-5}$ M).