High-affinity Fe$_3$O$_4$/Au probe with synergetic effect of surface plasmon resonance and charge transfer enabling improved SERS sensing of dopamine in biofluids

Pan Li,$^{a,b}$ Meihong Ge,$^{a,c}$ Chentai Cao,$^{a,c}$ Dongyue Lin,$^a$ Liangbao Yang$^{a,b,*}$

**Figure S1:** The TEM images and size distribution of (A) Fe$_3$O$_4$ and (B) Au NPs.

**Figure S2:** (A) The X-ray diffraction (XRD) and (B) X-ray photoelectron spectroscopy (XPS) analysis of Fe$_3$O$_4$/Au nanocomposite.
**Figure S3:** (A and B) SERS spectra of MG molecules collected from 60 randomly chosen sites on the Fe$_3$O$_4$/Au NPs substrates. (C and D) The area mapping and intensity distribution of 1615 cm$^{-1}$ characteristic peak and the statistical deviation of 1615 cm$^{-1}$ of MG collected from 60 randomly sites in C area.

**Figure S4:** The SERS spectra of DA molecules within different pH condition by using (A) the Fe$_3$O$_4$ and (B) Fe$_3$O$_4$/Au NPs as SERS active substrates.
**Figure S5:** The SERS spectrum of bare Fe$_3$O$_4$ (black line) and the SERS spectrum DA molecules on Au NPs (red line) and bare Fe$_3$O$_4$ (blue line).

**Figure S6:** The SERS spectra of DA molecules (5 μM) randomly collected from the Fe$_3$O$_4$/Au NPs active substrates.