Supporting Information

Core-shell Fructus Broussonetiae-like Au@Ag@Pt nanoparticles as highly efficient peroxidase mimetics for supersensitive resonance-enhanced Raman sensing

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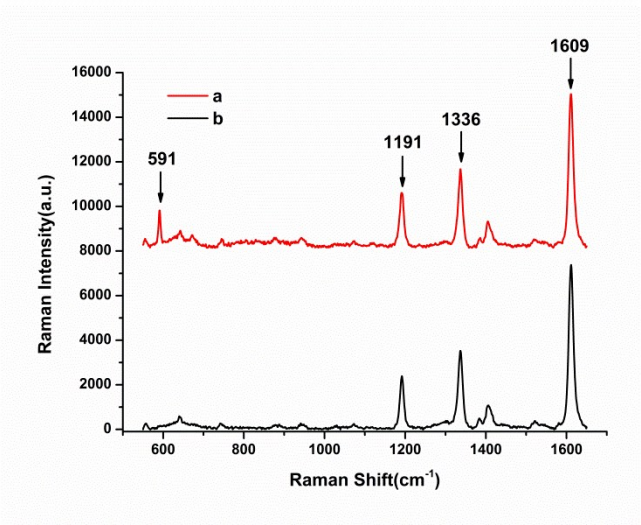

Fig. S1 Raman spectra of solutions after catalyzed by FBNPs prepared with (a) and without (b) using of CS, respectively.

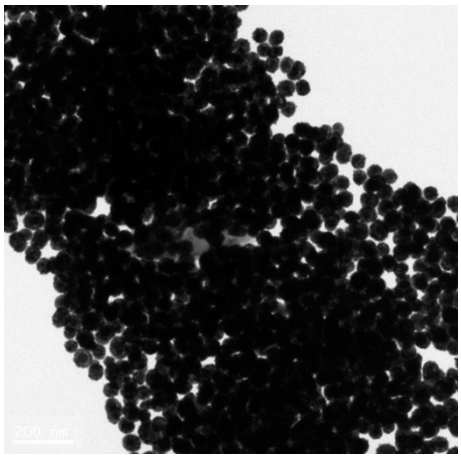

Fig. S2. TEM image of core-shell FBNPs without CS.

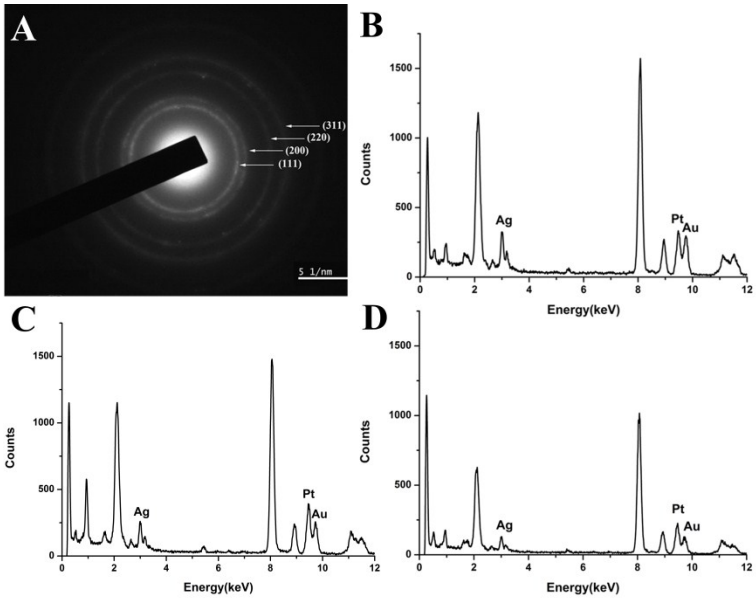

Fig. S3. (A) SAED pattern taken from the Pt shell. (B) EDX spectrum of FBNPs with (A) 1200 µL, (B) 1800µL, (C) 2400µL of 1 mM H_2PtCl_6. The calculated Ag/Au mole ratio of FBNPs was B) 0.68, C) 0.59, (D) 0.50 while the initial Ag/Au mole ratio of Au@Ag was 1.21 for B, C, D.

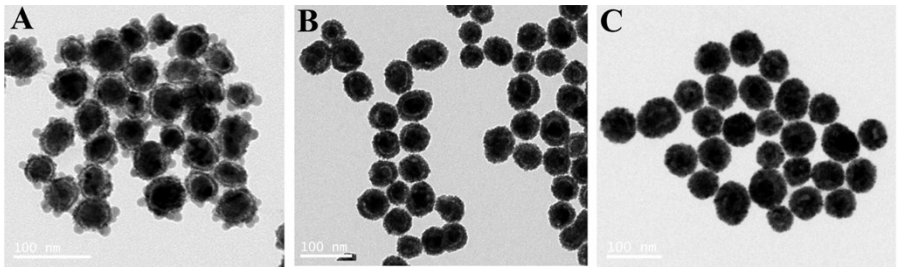

Fig. S4. TEM images of FBNPs with (A) 300 µL, (B) 1800µL, (C) 2400µL of 1 mM H_2PtCl_6.

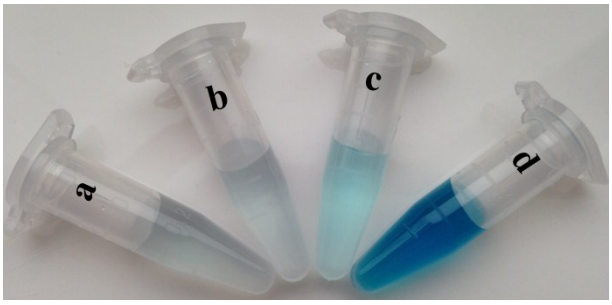

Fig. S5 The photograph of different solutions after catalyzed by Au NPs (a), Au@Ag NPs (b), Au@Ag@CS NPs (c) and FBNPs (d), respectively.

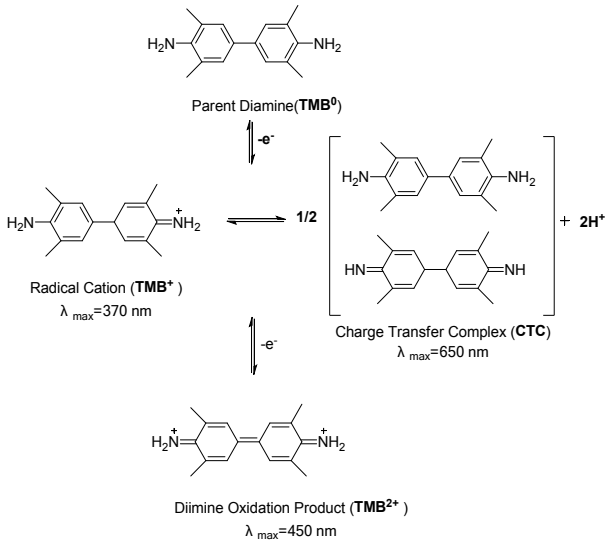

Fig. S6. Oxidation of TMB by H_2O_2 in the presence of HRP proceeds by two successive one-electron oxidation steps

Table S1. Tentative assignments of the Raman bands for the CTC complex at 632.8 nm

Raman shift (cm^{-1})	Band assignment
1191	CH_3 bending mode
1336	Inter-ring C-C stretching mode
1609	Ring stretching and C-H bending modes

Table S2. Comparison of the kinetic parameters of HRP and FBNPs.

Catalyst	Substrate	K_m/mM	$V_{max}/10^{-7}$mM·s^{-1}
HRP	H_2O_2	3.70	0.871
HRP	TMB	0.434	1.000
Au@Pt	H_2O_2	0.0583	1.196
Au@Pt	TMB	0.130	298.4

K_m: Michaelis constant, V_{max}: maximal reaction velocity.

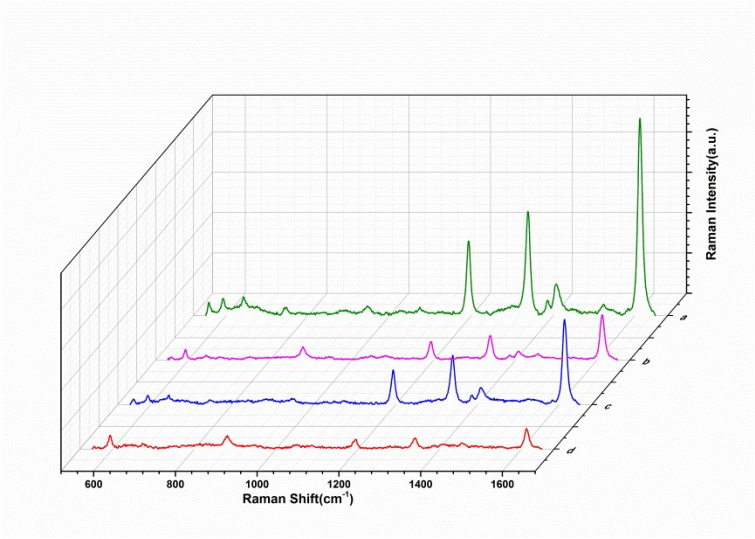

Fig. S7. Raman spectra obtained with and without heating, respectively. (a) TMB, H_2O_2 and FBNPs heated at 45°C, (b) TMB and H_2O_2 heated at 45°C, (c) TMB, H_2O_2 and FBNPs at room temperature, (d) TMB and H_2O_2 at room temperature.

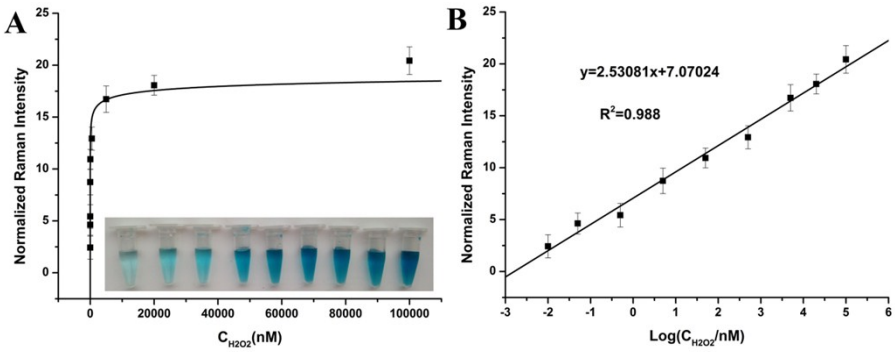

Fig. S8. (A) H_2O_2 concentration dependant of normalized Raman intensity. The inset shows the color change for different concentrations of targets. (B) The calibration curve of normalized Raman intensity against natural logarithm over concentration of H_2O_2. The error bars illustrate the standard deviations of three independent measurements.

Table S3. Results of the recovery of glucose from spiked human serum samples

Blood serum sample	Added (μM)	Found (μM)	Recovery (%)	RSD (%)
1	5	4.74	94.8	1.84
2	10	9.55	95.5	4.52
3	15	15.35	102.3	3.95