Supplementary Information for

Trichloroethylene sensing in water based on SERS with multifunctional Au/TiO_2 core-shell nanocomposites

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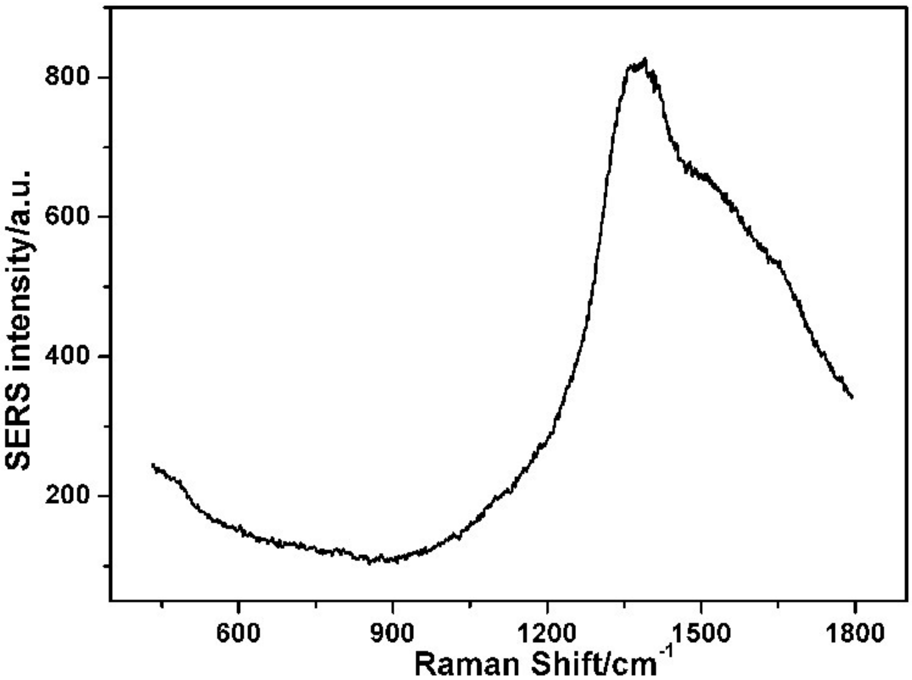

Fig. S1 Average background spectra of glass container used for SERS measurement.

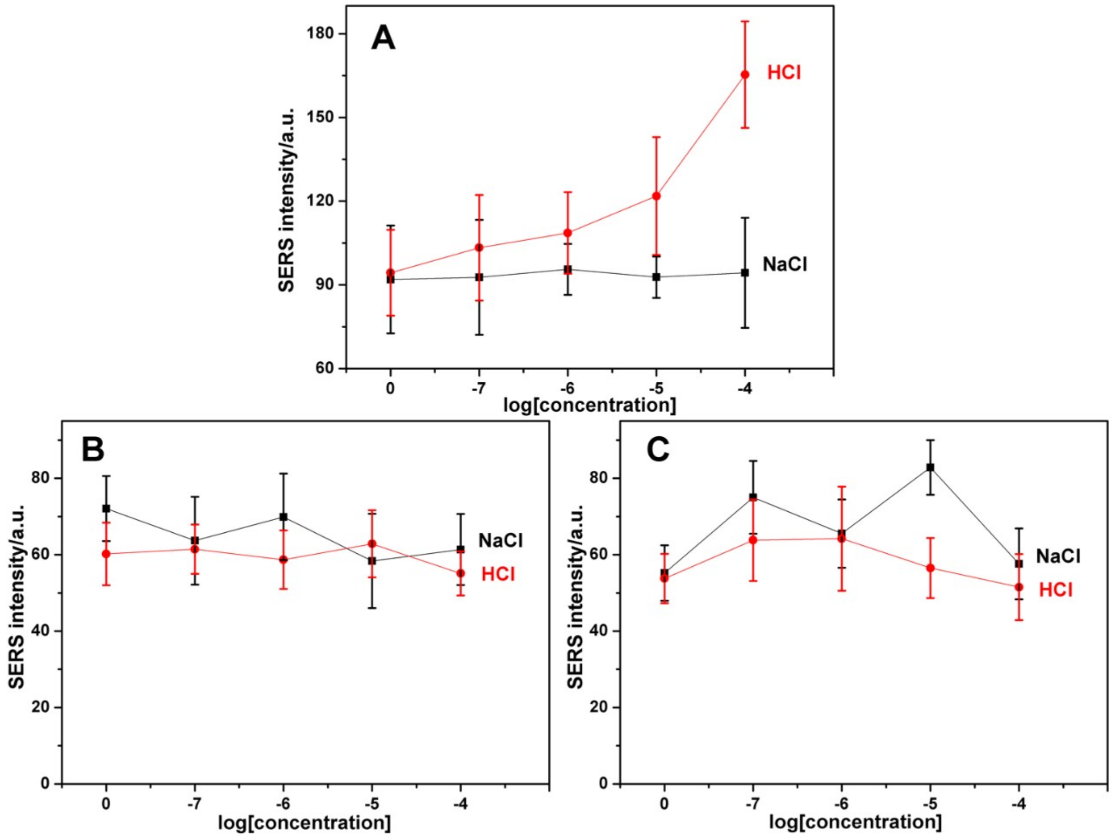

Fig. S2 SERS intensity of the peak at 1095 cm^{-1} [mean ± SD, n = 3] from GNPs modified with 4-MPy after 90 min of addition of serial concentrations of HCl or NaCl (A), and SERS intensity of the peak at 1095 cm^{-1} [mean ± SD, n = 3] from Au/TiO_2 core-shell nanocomposites after 90 min (B) and 24 h (C) of addition of serial concentrations of HCl or NaCl. The results from GNPs modified with 4-MPy show that hydrions will increase the SERS intensity while chloridions less than 10^{-4} M will not significantly influence the SERS intensity. Meanwhile the results from the samples of Au/TiO_2 core-shell nanocomposites with added HCl exhibit that the added HCl will not affect the SERS of the nanocomposites, suggesting that only the HCl generated in the TiO_2 shell will improve the SERS intensity.

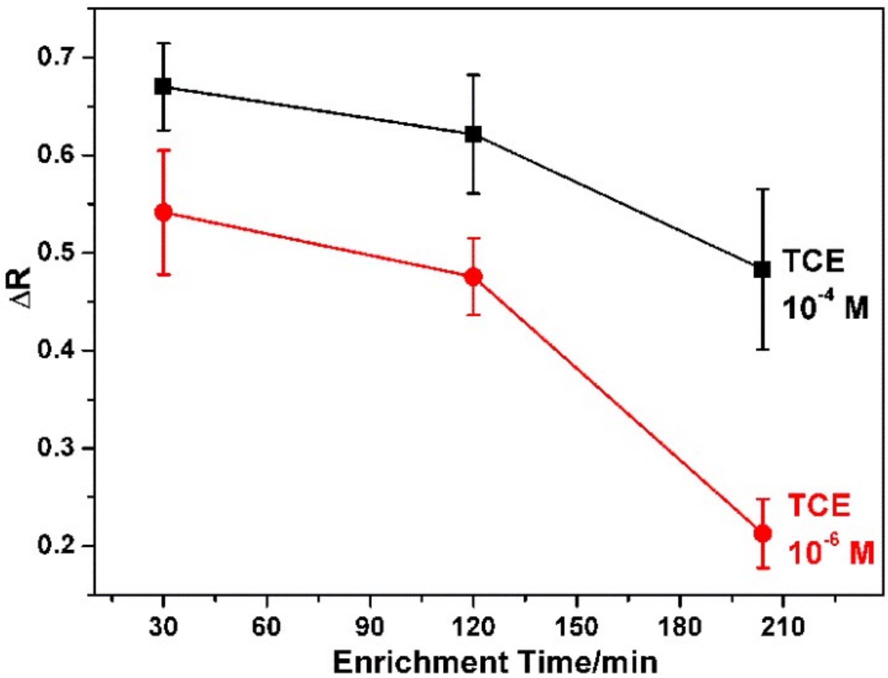

Fig. S3. SERS intensity change of the peak at 1095 cm^{-1} [mean ± SD, n = 3] in the samples with 10^{-4} and 10^{-6} M of TCE for different duration of enrichment.

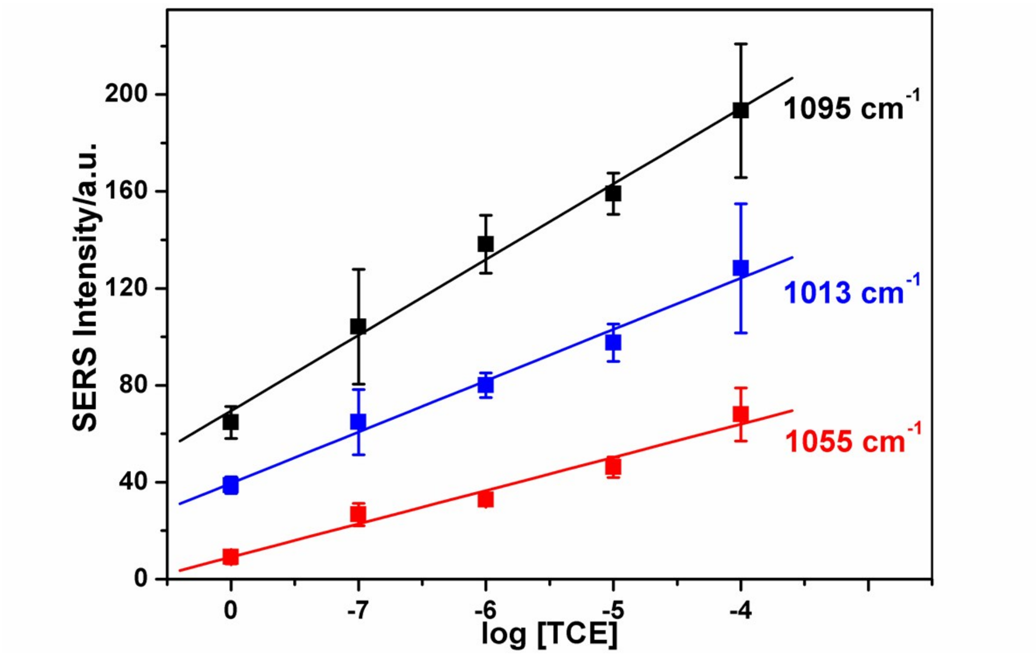

Fig. S4 Calibration plot in response to serial concentration TCE based on SERS intensity of the peak at 1095, 1055 and 1013 cm^{-1}.

Table S1. LOD and R^2 based on the peaks at 1095, 1055 and 1013 cm^{-1}

Peak position	LOD/μM	LOD/ppb	R^2
1095 cm^{-1}	0.038	5.0	0.993
1055 cm^{-1}	0.068	8.9	0.968
1013 cm^{-1}	0.060	7.9	0.985

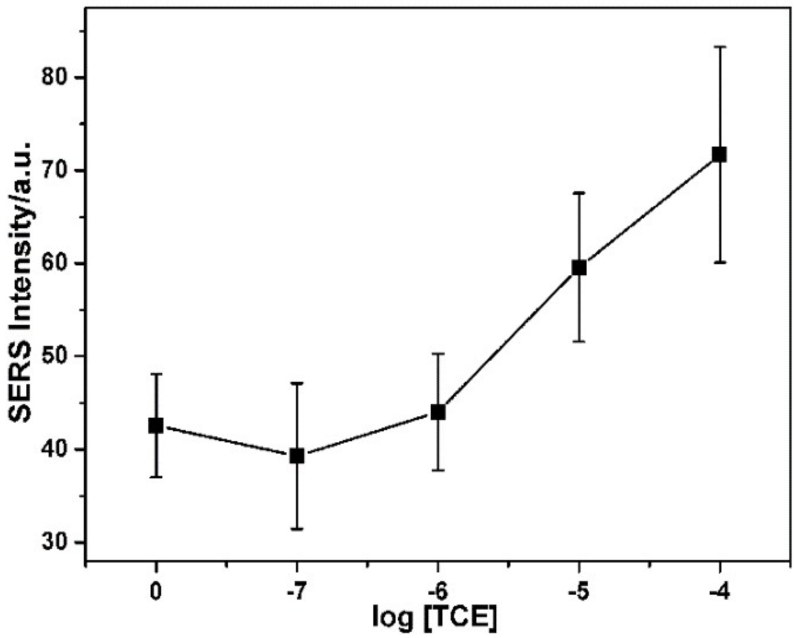

Fig. S5. SERS intensity of the peak at 1095 cm^{-1} [mean ± SD, n = 3] from unpurified water samples from river purposefully contaminated with TCE. The dust and other suspended solid in unpurified river water are believed to influence the TCE absorption of the TiO_2 shell and thus the detection of TCE less than 10^{-6} M.

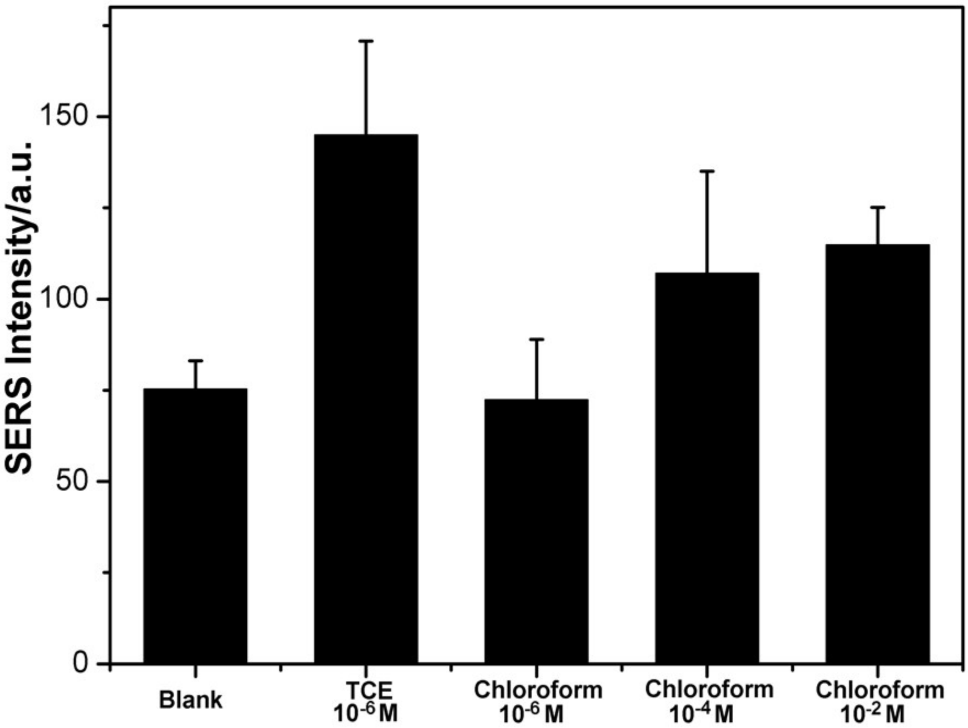

Fig. S6. SERS intensity of the peak at 1095 cm^{-1} [mean ± SD, n = 3] from blank and the samples with 10^{-6} M TCE, 10^{-6}, 10^{-4}, 10^{-2} M chloroform.