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## **Electronic Supplementary Material**

## in

On site determination of free chlorine in water samples by a smartphone-based

colorimetric device with improvement sensitivity and reliability

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Fig. S1. TEM images of methionine stabilized Au nanoclusters.



Fig. S2. Calibration curves for free chlorine determination by smartphone-based colorimetric device with reflector to enhance the fluorescent brightness in the measuring area. (a) without reflector, (b) aluminum foil film, (c) reflection mirror.



**Fig. S3.** Influence of the exposure time (ISO=160) on the brightness of fluorescent images (A) and absorbance (B) in the portable device. (a) brightness of reference fluorescent image, (b), (c) and (d) brightness of measuring fluorescent images at free chlorine concentration of 10, 30 and d=50  $\mu$ g/L, (e), (f) and (g) absorbance at free chlorine concentration of 10, 30 and d=50  $\mu$ g/L, respectively.



**Fig. S4.** Influence of ISO (exposure time =125 ms) on the brightness of fluorescent images (A) and absorbance (B) in the portable device. (a) brightness of reference fluorescent image, (b), (c) and (d) brightness of measuring fluorescent images at free chlorine concentration of 10, 30 and d=50  $\mu$ g/L, (e), (f) and (g) absorbance at free chlorine concentration of 10, 30 and d=50  $\mu$ g/L, respectively.



**Fig. S5** Absorption spectra of the mixture of  $K_2Cr_2O_7$  –KCrO<sub>4</sub> (pH=2.2, 3.7g/L KCl). Insert: Calibration curve for chlorine using the  $K_2Cr_2O_7$  –KCrO<sub>4</sub> indirect criteria. UV-1700 spectrophotometer, 1 cm cuvette.



**Fig. S6** Dependence of the concentration of free chlorine in tap water on the standing time at ambient temperature of 25 °C.