Supplementary Material (ESI) for Analyst

Electronic supplementary information

Fluorescence Turn-On Detection of Iodide, Iodate and Total Iodine Using Fluorescein-5-Isothiocyanate-Modified Gold Nanoparticles

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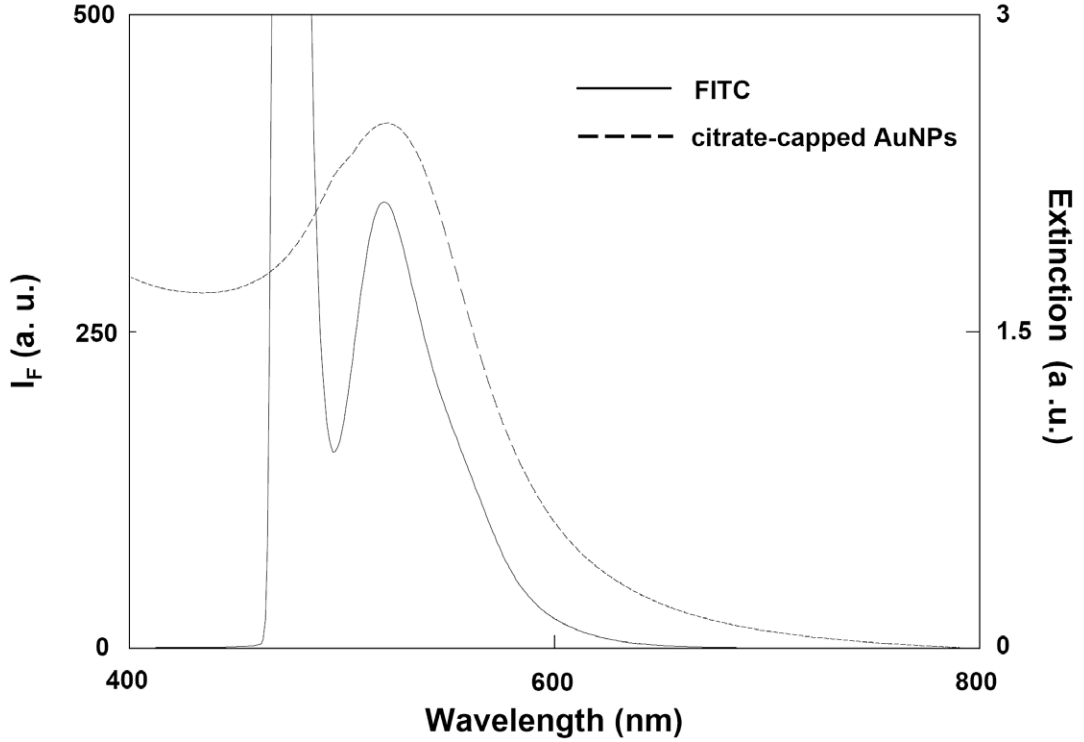

Fig. S1. Fluorescence spectra of 0.1 μM FITC and extinction spectra of 15.0 nM citrate-capped AuNPs. The excitation wavelength for FITC was set at 470 nm. The fluorescence intensities (I_F) are plotted in arbitrary unit (a. u.).

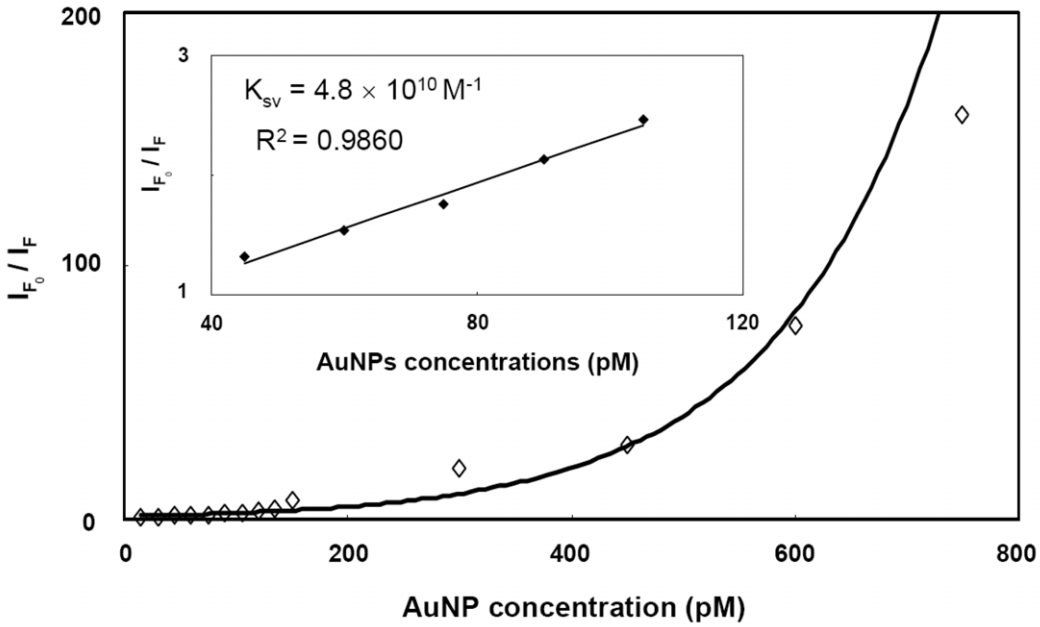

Fig. S2. Stern-Volmer plots of the fluorescence quenching of FITC (0.1 μM) by AuNPs. The FITC is prepared in 20 mM phosphate solution at pH 7.0

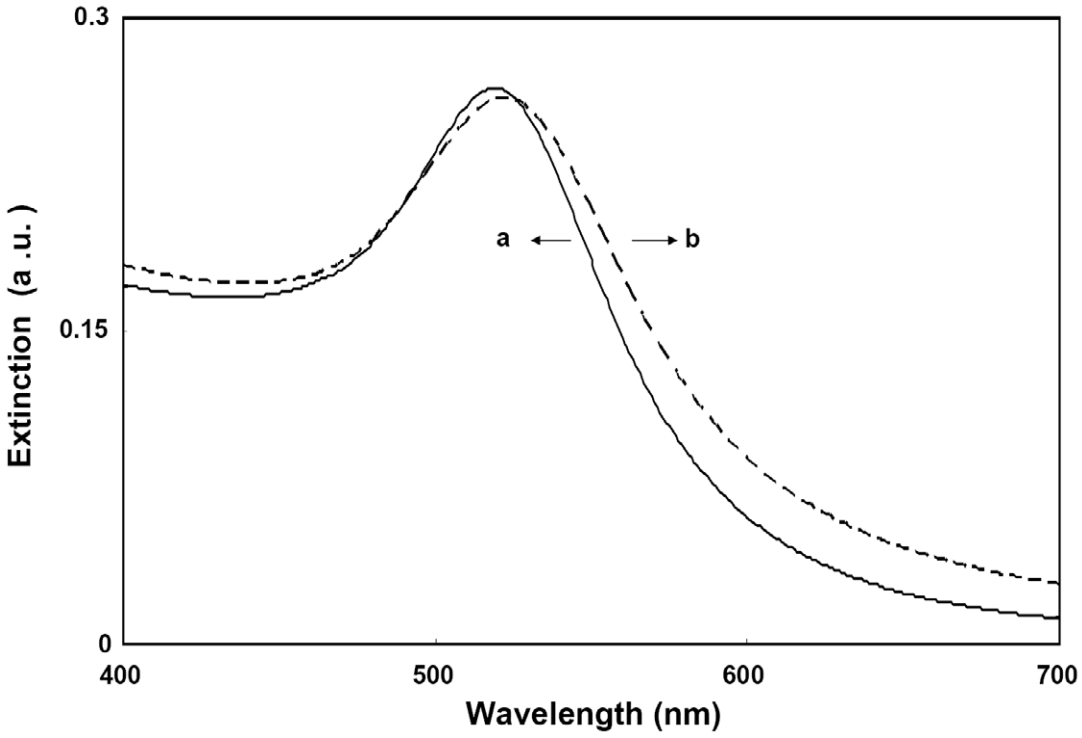

Fig. S3. Extinction spectra of 1.5 nM FITC-AuNPs in the (a) absence and (b) presence of 10.0 μM I^-. Buffer: 20 mM phosphate solution, pH 8.0.

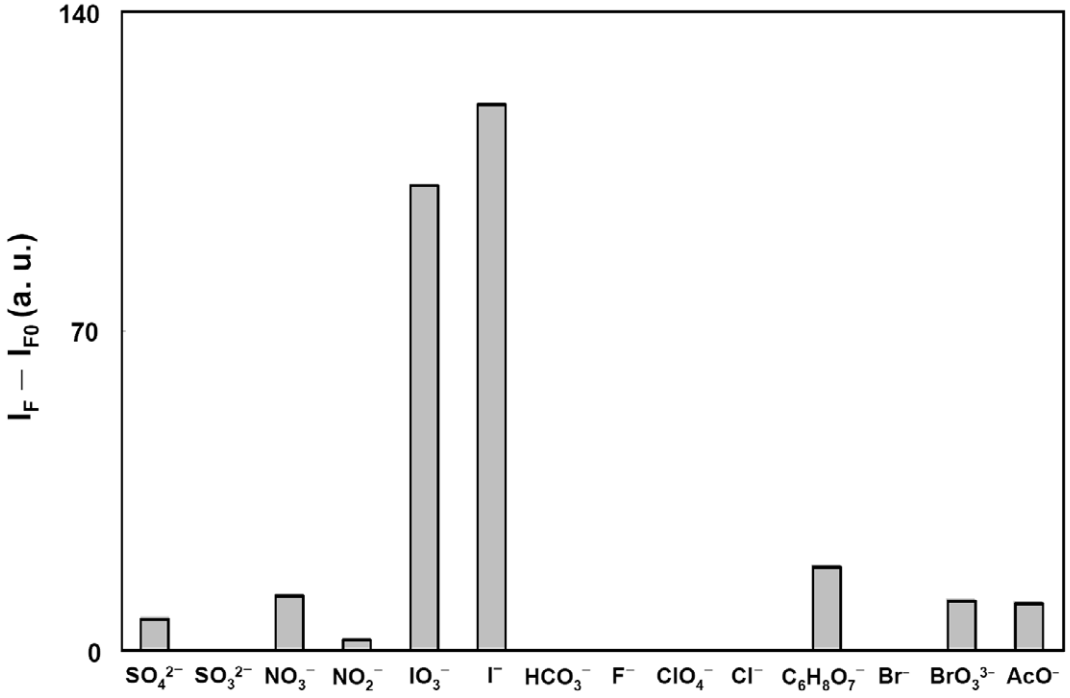

Fig. S4. The difference in fluorescence intensity of 1.5 nM FITC-AuNPs before and after the addition of I^- (0.1 μM), IO_3^- (0.1 μM), and other anions (1.0 μM). The anions were pretreated with 5 mM ascorbic acid for 10 min. Buffer: 20 mM phosphate solution, pH 8.0. The excitation wavelength was set at 470 nm. The incubation time was 20 min

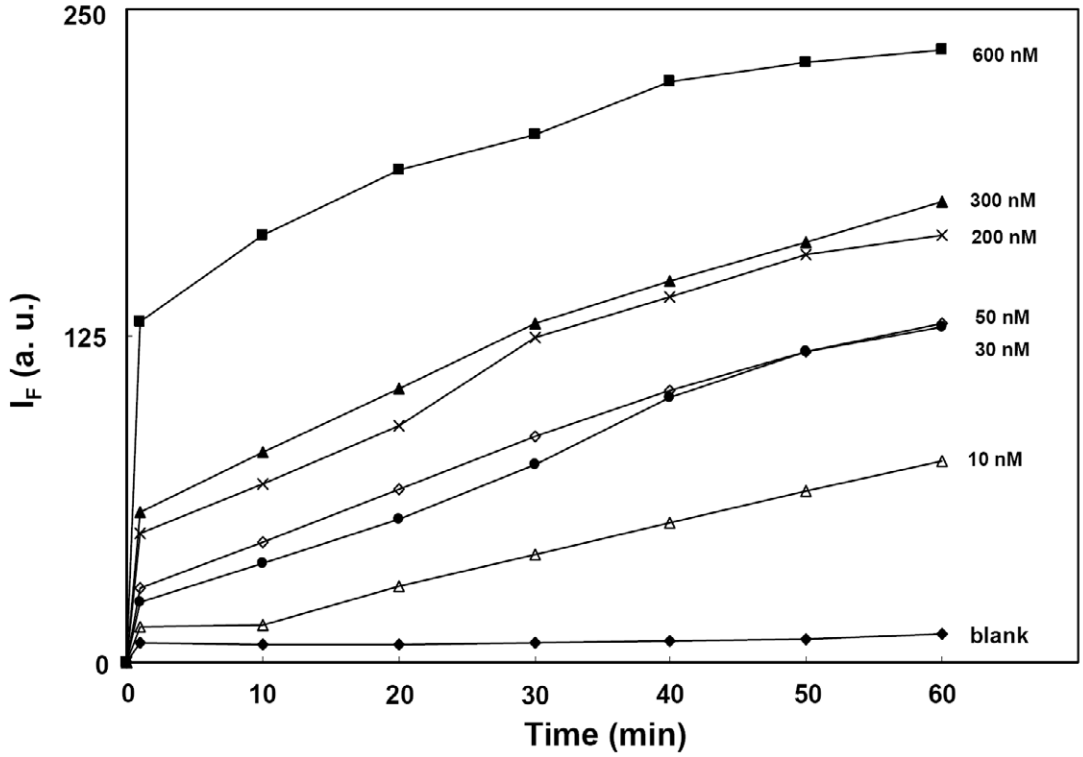

Fig. S5. Time evolution measurement of fluorescence intensity of 1.5 nM FITC-AuNPs upon the addition of 0–600.0 nM I^-. They were pretreated with 5 mM ascorbic acid for 10 min. Buffer: 20 mM phosphate solution, pH 8.0. The excitation wavelength was set at 470 nm.

Table S1.

A comparison of other assays for the detection of I^-.

Reagents[a]	Detection	Linear ranges (μM)	Test anions[b]	Reference
Luminol–HTAC reversed micelle system	Luminescence	0.6 to 60.0	Br^-, Cl^-, CH_3COO^-, PO_4^{3-}, NO_3^-, NO_2^-, CO_3^{2-}, SO_4^{2-}, S^{2-}	Fujiwara et al. 2000
Pyrene is covalently anchored on delaminatd zeolite ITQ-2	Fluorescence quenching	2000.0 to 100000.0	Br^-, Cl^-, F^-,	Corma et al. 2002
Cationic polythiophene derivative	Fluorescence quenching	2.0 to 11.0	Br^-, Cl^-, F^-, CO_3^{2-}, HCO_3^-, $H_2PO_4^-$, HPO_4^{2-}, CH_3COO^-, $EDTA^{4-}$, SO_4^{2-}, $(C_6H_5)_4B^-$	Ho and Leclerc 2003
Membrane contains quinine and benzothioxanthene derivative	Ratiometric fluorescence	200.0 to 6000.0	SO_4^{2-}, NO_3^-, HCO_3^-, F^-, Cl^-, Br^-, CH_3COO^-, $H_2PO_4^-$, SCN^-, $C_4H_4O_6^{2-}$, $C_6H_8O_7^{3-}$, DB,	Nie et al. 2005
Carbazole-containing conjugated copolymer	Fluorescence quenching	0.4 to 2.0	Br^-, Cl^-, F^-, ClO_4^-, $H_2PO_4^-$, HS^-	Vetrichelvan et al. 2006
DBT-Hg(II) complex	Fluorescence enhancement	0.45 to 4.50	S^{2-}, $EDTA^{4-}$, SCN^-, $CH_3CO_2^-$, Br^-, Cl^-, F^-, $H_2PO_4^-$, SO_4^{2-}	Lin et al. 2007
Benzimidazole-based tripodal receptor	Fluorescence quenching	0.2 to 5.0	Br^-, Cl^-, F^-, NO_3^-, HSO_4^-, CH_3COO^-, $H_2PO_4^-$	Singh and Jang 2007
Immobilization of MC on triacetylcellulose polymer	Absorbance	3.9 to 5500.0	CO_3^{2-}, NO_3^-, Br^-, Cl^-, F^-, $C_2O_4^{2-}$	Rastegarzadeh et al. 2008
FITC-AuNPs	Fluorescence enhancement	0.01 to 0.6	SO_4^{2-}, SO_3^{2-}, NO_3^-, NO_2^-, I^-, IO_3^-, HCO_3^-, F^-, ClO_4^-, Cl^-, $C_6H_8O_7^{3-}$, Br^-, BrO_3^-, CH_3COO^-	This study

[a] HTAC, hexadecyltrimethylammonium chloride; DBT, p-((dimethylamino)benzylidene)thiosemicarbazide; MC, methyltrioctylammonium chloride; [b] DB, dodecylbenzensulphonate.

References

A. Corma, M. S. Galletero, H. García, E. Palomares and R. Fernando, *Chem. Commun.,* 2002, **10,** 1100-1101.

T. Fujiwara, I. U. Mohammadzai, H. Inoue and T. Kumamaru, *Analyst,* 2000, **125,** 759-763.

M. Leclerc and H. A. Ho, *J. Am. Chem. Soc.,* 2003, **125,** 4412-4413.

L.–R. Lin, W. Fang, Y. Yu, R.–B. Huang and L.–S. Zheng, *Spectrochimica Acta A,* 2007, **67,** 1403-1406.

C.–G. Niu, A.–L. Guan, G.–M. Zeng, Y.–G. Liu, G.–H. Huang, P. –F. Gao and X.–Q. Gui, *Analytica Chimica Acta,* 2005, **547,** 221-228.

S. Rastegarzadeh, N. Pourreza and I. Saeedi, *Talanta,* 2009, **77,** 1032-1036.

N. Singh and D. O. Jang, *Organic Letters,* 2007, **9,** 1991-1994.

M. Vetrichelvan, R. Nagarajan and S. Valiyaveettil, *Macromolecules,* 2006, **39***,* 8303-8310.