Electronic Supplementary Material (ESI) for New Journal of Chemistry.

SUPPORTING INFORMATION

Preparation of temperature-responsive block copolymer anchored graphene oxide@ZnS NPs luminescent nanocomposite for selective detection of 2,4,6-trinitrotoluene

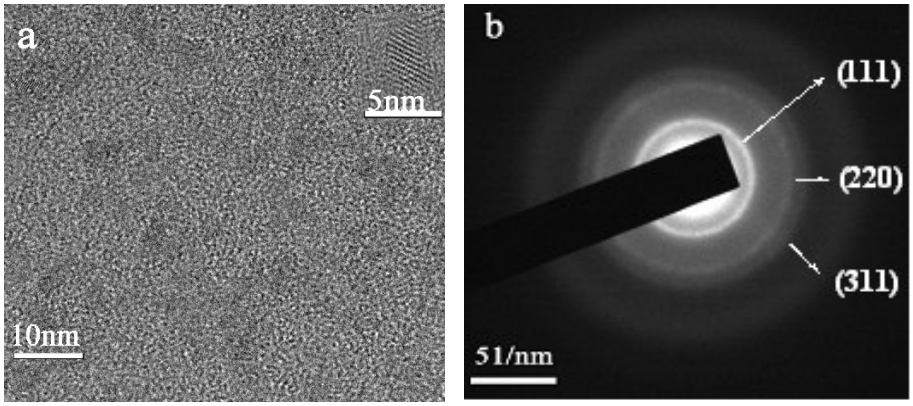

Fig. S1. HRTEM image (a) and SAED pattern (b) of ZnS NPs.

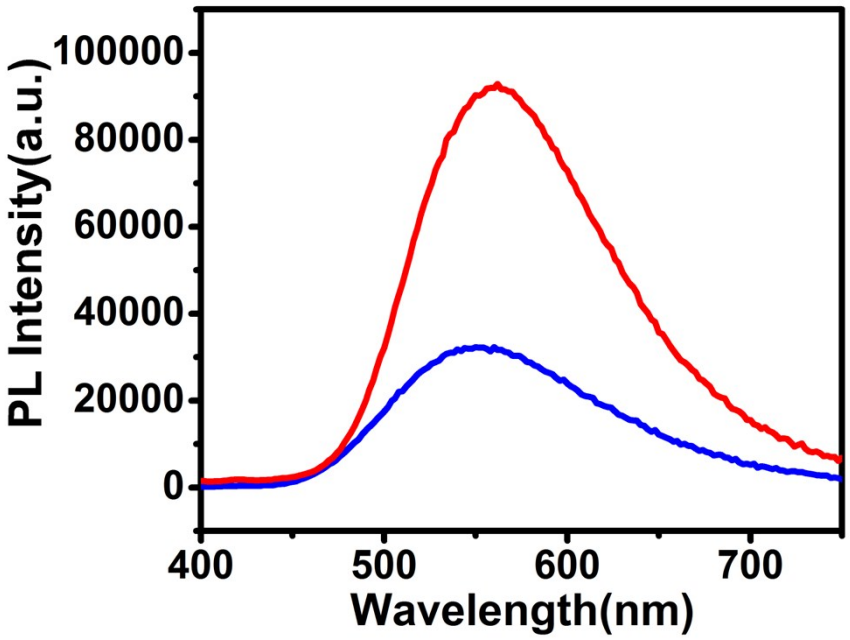

Fig.S2. PL spectra of ZnS NPs containing block copolymer (red) and Znq_2-containing block copolymer (blue).

Calculation of Detection Limit

The detection limit plot for TNT was obtained by plotting change in the PL intensity vs TNT concentration. The curve demonstrated a linear relationship and the correlation coefficient (R^2) via linear regression analysis was calculated to be 0.99. The limit of detection (LOD) was then calculated using the equation 3σ/K, where σ denotes the standard deviation for the intensity of sensing system in the absence of TNT and was calculated for the peak intensity value using 'Statistics on Columns' option in origin software and verified with online calculator. K represents slope of the equation.

$LOD = 3\sigma/K$

$= 3\times74.36/(5.07E10)$

$= 4.4\times10^{-9}M$

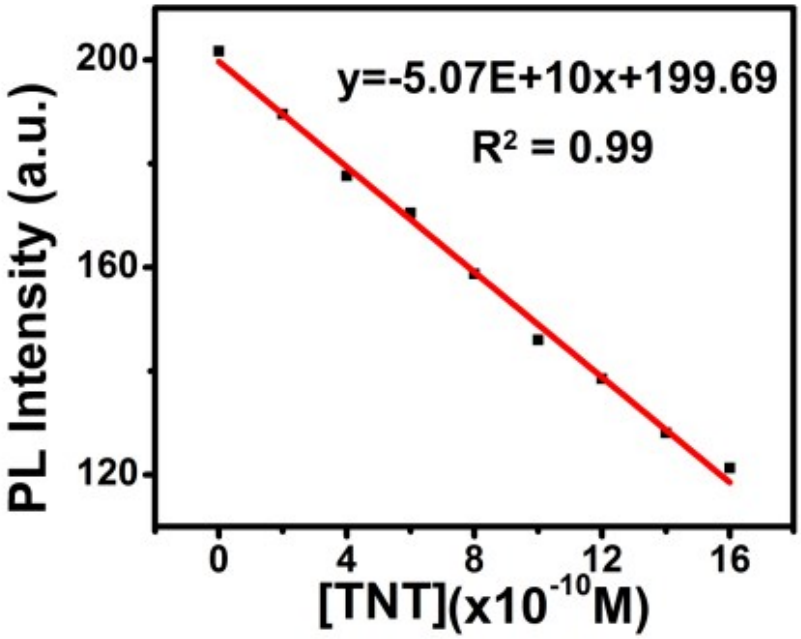

Fig. S3. Relation of PL intensity against the concentration of TNT and linear fit for estimation of detection limit.

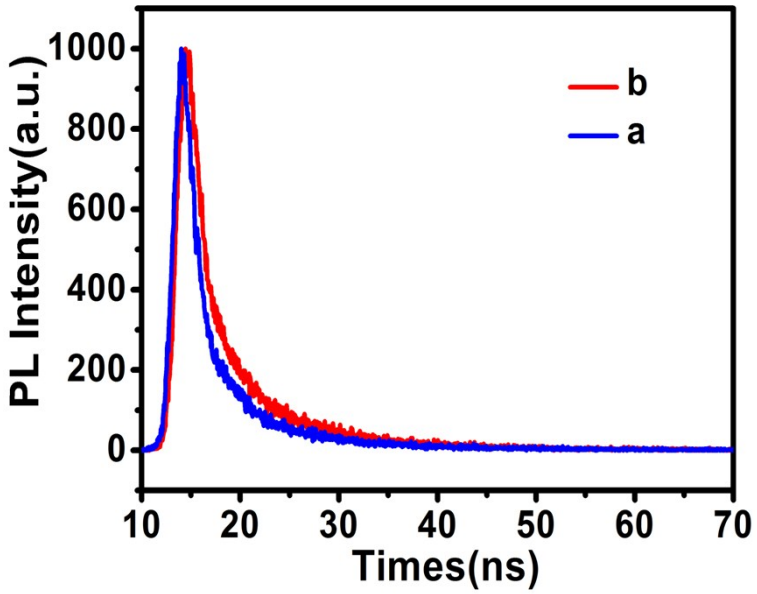

Fig. S4. Fluorescence decay curves for ZnS NPs-containing block copolymer-GO nanocomposite in DMF solution with (a) and without TNT (b) (monitored at 526 nm).

Table S1. A comparative study of the *K*sv, detection limit and materials used for TNT detection of some recent representative reports.

Publication	Material used	$K_{SV}(M^{-1})$	Detection limit
Present work	ZnS NPs-containing block copolymer-GO nanocomposite	3.3×10^9	4.4 nM
Chem. Eur. J., 2016, 22, 2012	Vinylpyridine appended anthracene derivatives	4.3×10^4	500 ppb
Cryst.Growth Des., 2016,16,842	Metal-organic framework	4.0×10^4	0.18 μ M
ACS Appl. Mater. Interfaces 2015, 7, 21038	Pyrene-functional polystyrene copolymer	-	5 nM
RSC Adv., 2015, 5,33306	Phenylethynylene calix[4]arenes	1.09×10^5	0.3 μM
Polym. Chem., 2014, 5, 4521	Porous hyperbranched conjugated polymer nanoparticles (PHCPN)	1.38×10^3	0.5 ng mm^2
Dyes Pigments 2014,101, 122.	GO-PPV@MSN hybrid	7.4×10^4	13 μM
Analyst,2014,139, 2379	FGO-ZnS:Mn NCs	-	5.68 ng/ mm^{-2}
ACS Appl. Mater. Interfaces.2013,5, 8146	MIP-capped CdTe QDs	-	0.28 μM
J. Lumin., 2014,146, 502	FITC-(NH_2)-CD	3.79×10^5	20 nM
Talanta, 2014,120, 100.	Amine functionalized $NaYF_4$:Yb^{3+} /Er^{3+} UCNPs	-	9.7 ng/mL
Chem.Mater., 2014, 26, 4221	Graphene derivative	8.9×10^5	300 ppb
Chem. Eur. J., 2014, 20, 12215	α-Cyanostilbene derivative	3.3×10^5	0.28 μM

Table S2. Fluorescence decay data of ZnS NPs-containing block copolymer-GO nanocomposite.

Samples	τ_1(ns)[a]	b_1	τ_2(ns)[a]	b_2	τ_3(ns)[a]	b_3	τ_a[b]
Without TNT	0.37	0.31	2.61	0.25	8.58	0.44	4.5
With TNT	0.81	0.50	3.06	0.20	8.97	0.30	3.7

[a] The decay time of the samples was obtained from the decay curves, which were simulated by using the multiexponential model $I_{(t)} = \sum_{i=1}^{n} a_i \exp(-t/\tau_i)$ at 526 nm. The excitation wavelength for all the samples is 365 nm. The wavelength for 526 nm shows the three index exponential fluorescence decay.

[b] Average fluorescence lifetime: $<\tau_a>=\alpha_1\tau_1+\alpha_2\tau_2+\alpha_3\tau_3$。