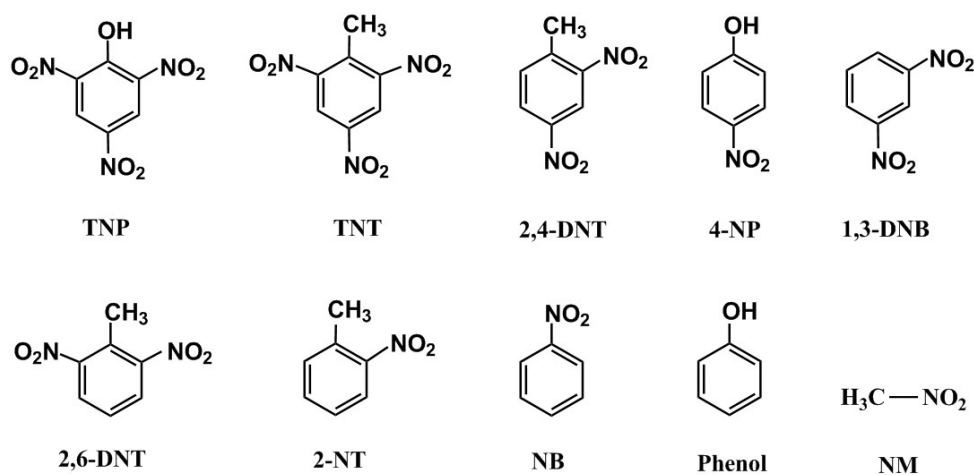# Electronic supplementary information for

Temperature responsive polymer brushes grafted from graphene oxide: an efficient fluorescent sensing platform for 2,4,6-trinitrophenol

Yajiao Song, Jianhua Lü, Bingxin Liu and Changli Lü

Scheme S1 Structures of different nitro-compounds used in the experiments.

Calculation of fluorescence quenching efficiency

The fluorescence quenching efficiency (η) for each analyte was calculated by the following equation:

$$\eta = (I_0-I)/I_0 \times 100\ \%$$

in which I_0 and I are the fluorescence intensities in the absence and presence of analyte, respectively.

Table S1 A comparative study of the Ksv, detection limit and medium used for TNP detection of some recent representative reports.

Publication	Material used	$K_{SV}(M^{-1})$	Detection limit	Medium Used
Present work	Alq$_3$-containing Block copolymer brush-GO hybrid	5.5×10^8	2.38 n M	H$_2$O
Anal. Chem., **2012**, 84, 8415	Alq$_3$ nanospheres	1.4×10^7	32.3 n M	Phosphate buffer solution
Chem. Eur. J., **2016**, 22, 2012	Vinylpyridine Appended anthracene derivatives	4.3×10^4	500 ppb	THF
Sensors and Actuators B, **2016**, 230, 746	Small fluorescent molecule	7.0×10^4	0.47 μM	THF
Cryst.Growth Des., **2016**,16,842	Metal-organic framework	4.0×10^4	0.18 μ M	EtOH
Chem. Eur. J., **2016**, 22, 4931	Covalent Triazine Framework	8.0×10^5	–	H$_2$O/EtOH (v/v=4:1)
Chem.Commun., **2015**, 51, 7201	Conjugated polyelectrolyte	1.0×10^7	128 ppb	H$_2$O
ACS Appl. Mater. Interfaces, **2014**, 6,10722	Graphene oxide	1.3×10^5	125 ppb	Buffer
Chem.Mater., **2014**, 26, 4221	Graphene derivative	8.9×10^5	300 ppb	H$_2$O/THF (v/v=9:1)
Chem.Commun., **2014**, 50, 15788	Organic cage	2.2×10^5	6.4 ppb	DCM
Chem. Eur. J., **2014**, 20, 12215	α-Cyanostilbene derivative	3.3×10^5	0.28 μM	H$_2$O/THF (v/v=7:3)

Calculation of Detection Limit

The detection limit plot for TNP was obtained by plotting change in the fluorescence intensity vs the concentration of TNP. 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 $3\sigma/K$, where σ denotes the standard deviation for the intensity of sensing system in the absence of TNP 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.

$$LOD = 3\sigma/K$$

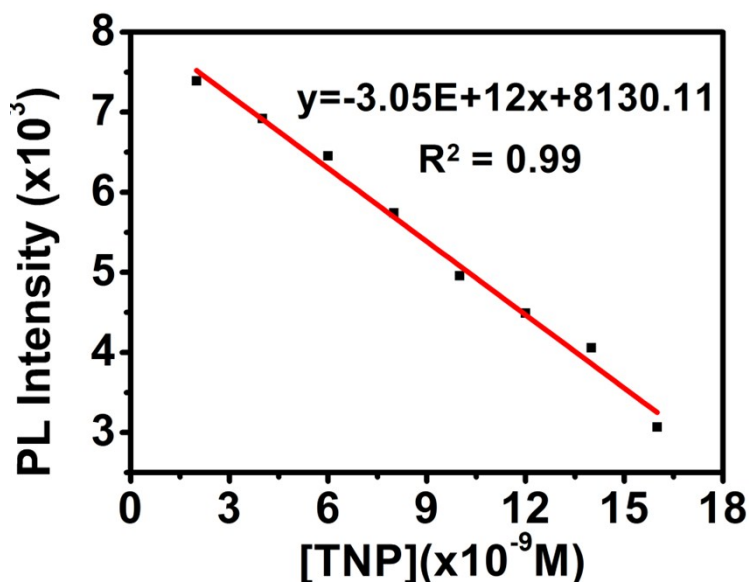$$= 3 \times 2427.1/(3.05E13)$$

$$= 2.38 \times 10^{-9} M$$

Fig.S1 Relation of PL intensity against the concentration of TNP and linear fit for estimation of detection limit.
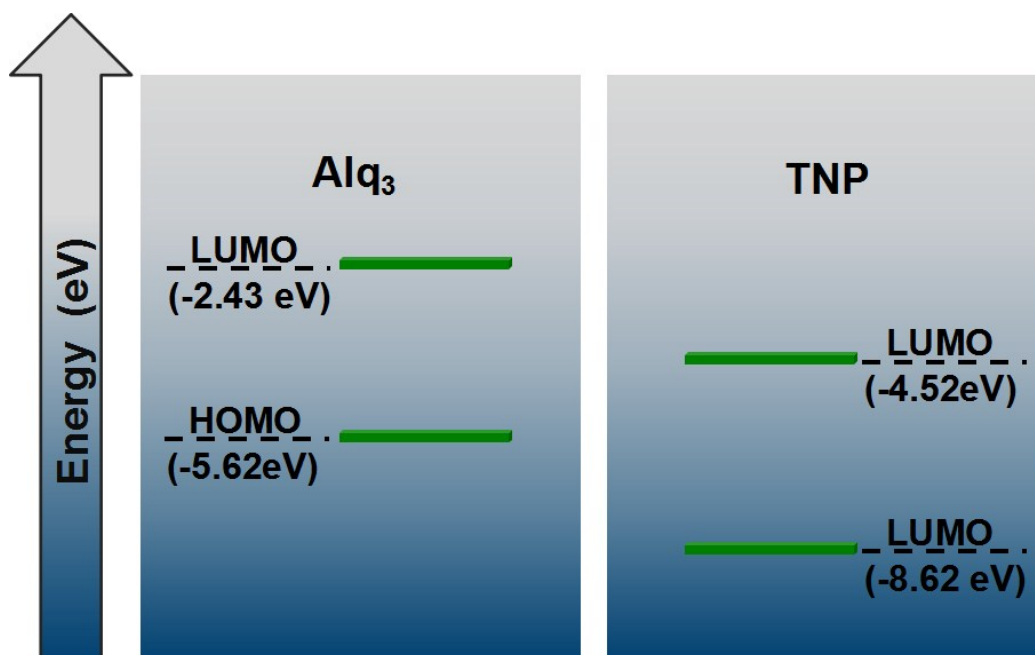
Fig.S2 Calculated energy diagram of Alq$_3$ and TNP (the calculated energy data come from the reported literatures 43, 48 and 50).
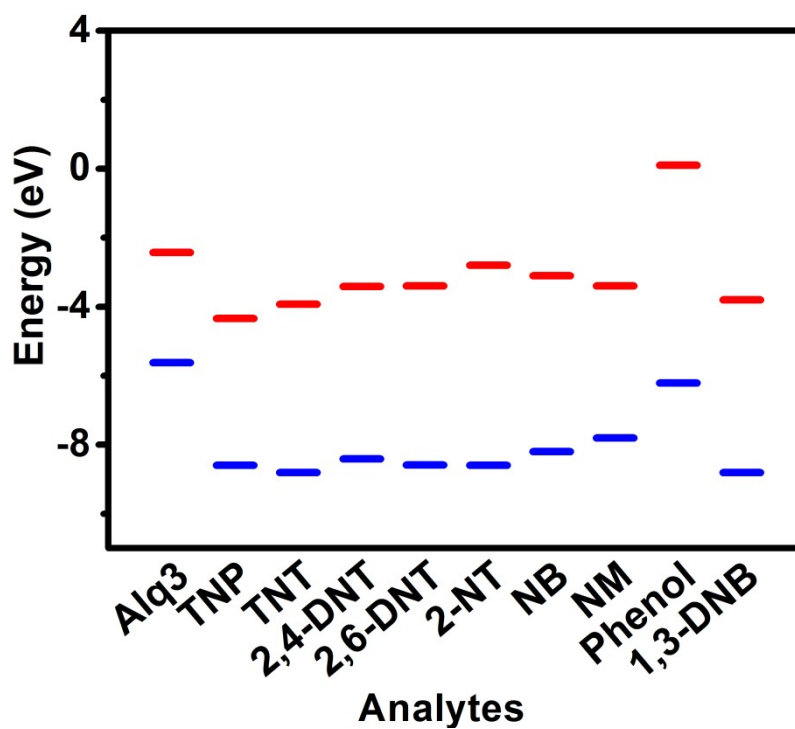

Fig.S3 HOMO and LUMO energies for Alq$_3$ and selected analytes (the calculated energy data come from the reported literatures 48, 50).