ELECTRONIC SUPPLEMENTARY INFORMATION

Ultra high sensitivity of luminescent $ZnCr_2O_4$ nanoparticles toward aromatic nitro explosives sensing

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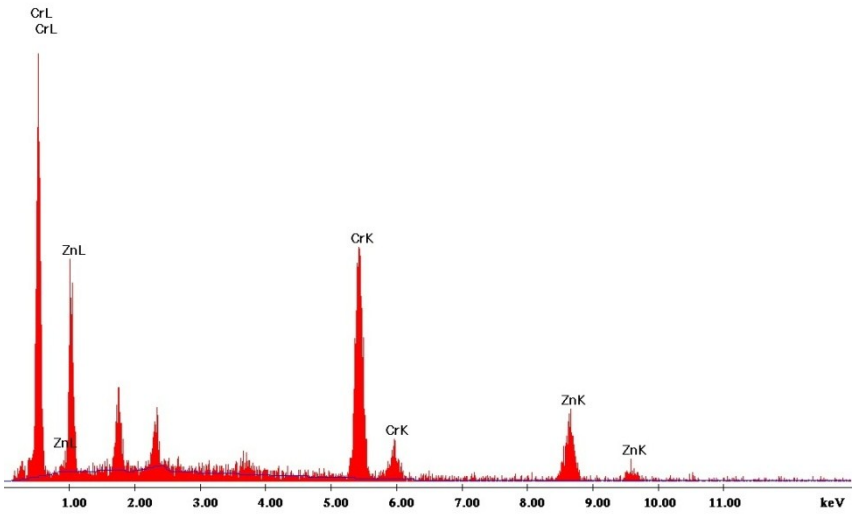
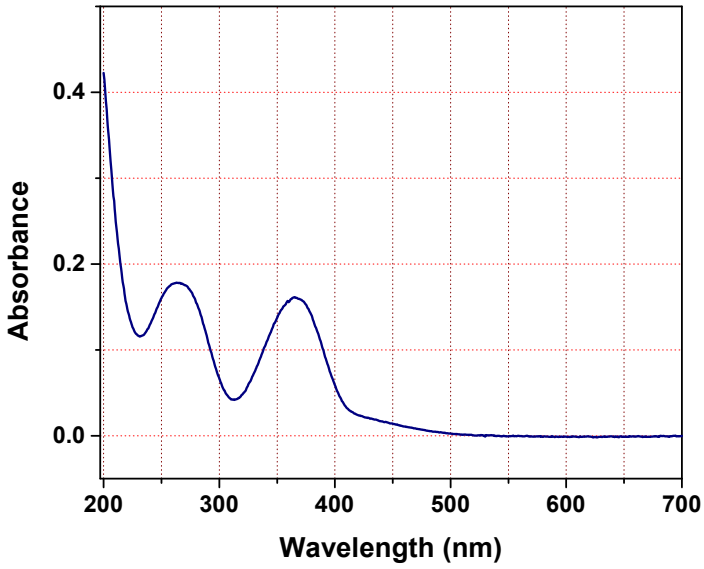


Figure S1: Representative EDX plot of $ZnCr_2O_4$, which confirms the presence of metal cations as per the nominal compositionof 1:2 (Zn:Cr).



.Figure S2: UV absorption spectra of aqueous suspended $ZnCr_2O_4$

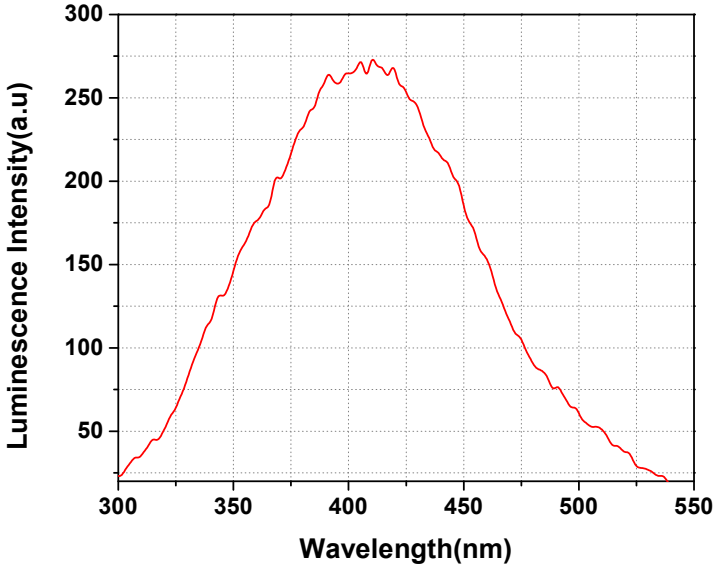


Figure S3: Emission spectrum of $ZnCr_2O_4$ suspended in water (λ_{ex} = 260 nm).

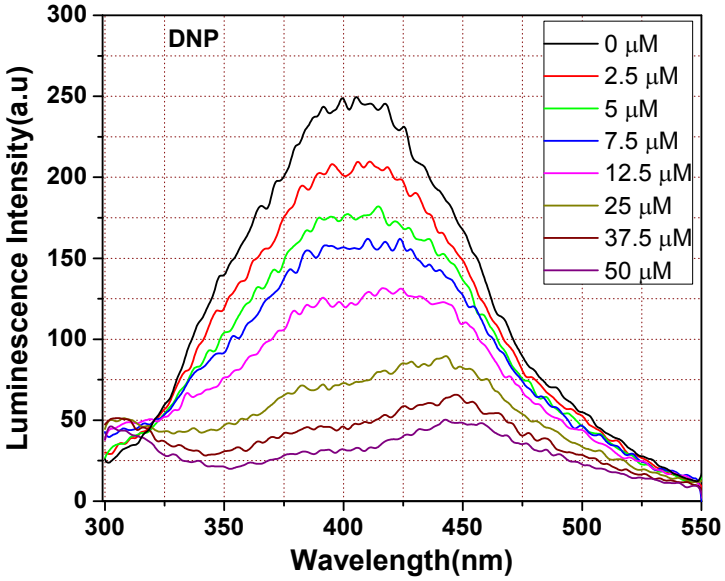


Figure S4: Emission spectra of $ZnCr_2O_4$ suspended in water upon incremental addition of DNP solution (λ_{ex}= 260 nm). The final concentration of DNP in the medium is indicated in the legend.

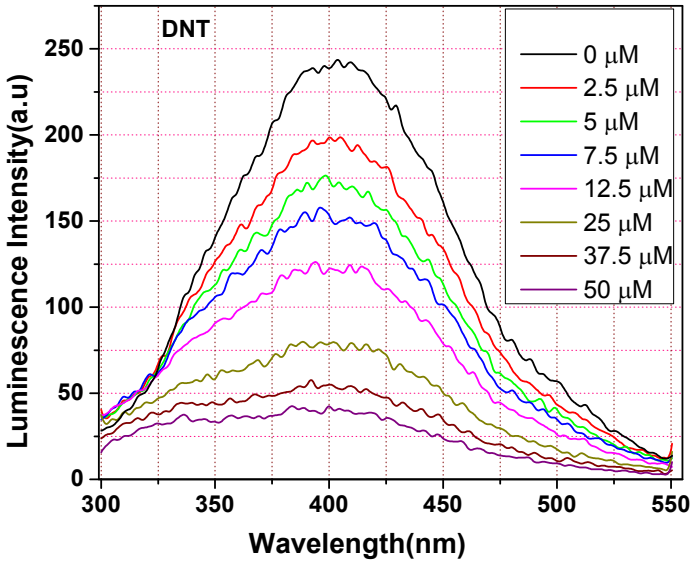


Figure S5: Emission spectra of $ZnCr_2O_4$ suspended in water upon incremental addition of DNT solution (λ_{ex} = 260 nm). The final concentration of DNT in the medium is indicated in the legend.

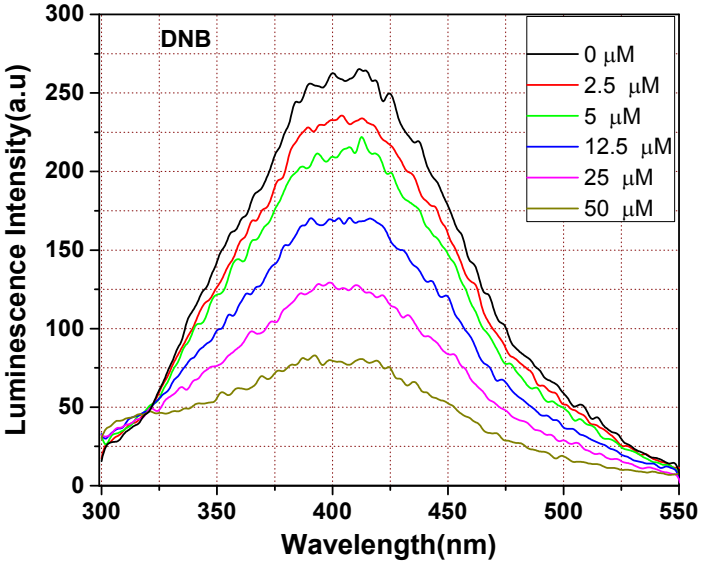


Figure S6: Emission spectra of $ZnCr_2O_4$ suspended in water upon incremental addition of DNB solution (λ_{ex} = 260 nm). The final concentration of DNB in the medium is indicated in the legend.

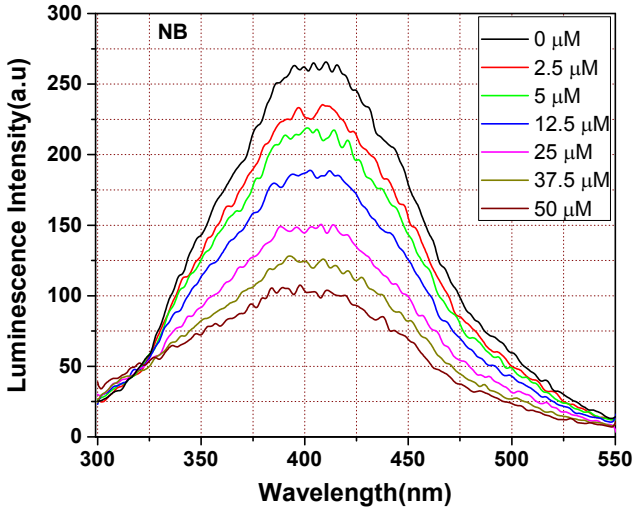


Figure S7: Emission spectra of $ZnCr_2O_4$ suspended in water upon incremental addition of NB solution (λ_{ex} = 260 nm). The final concentration of NB in the medium is indicated in the legend.

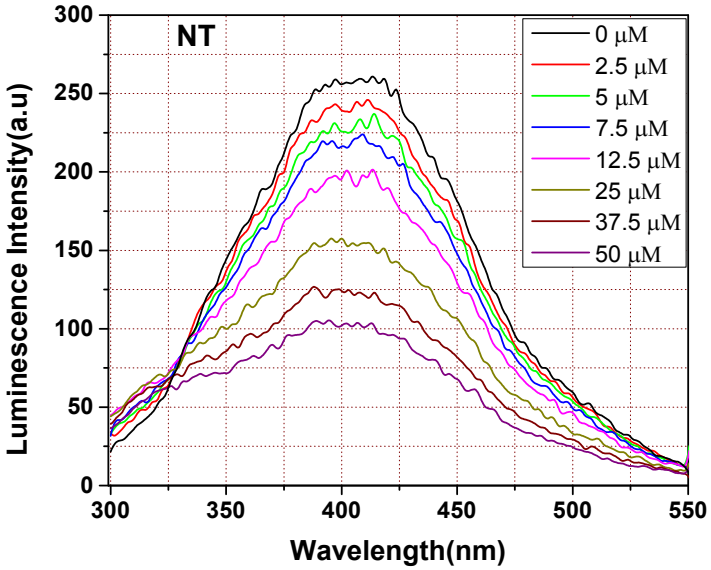


Figure S8: Emission spectra of $ZnCr_2O_4$ suspended in water upon incremental addition of NT solution (λ_{ex} = 260 nm). The final concentration of NT in the medium is indicated in the legend.

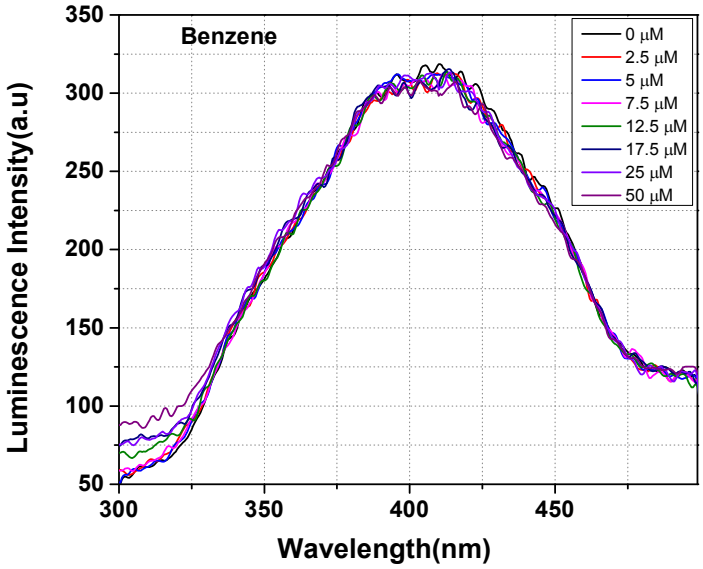


Figure S9: Emission spectra of $ZnCr_2O_4$ suspended in water upon incremental addition of Benzene solution (λ_{ex} = 260 nm). The final concentration of Benzene in the medium is indicated in the legend.

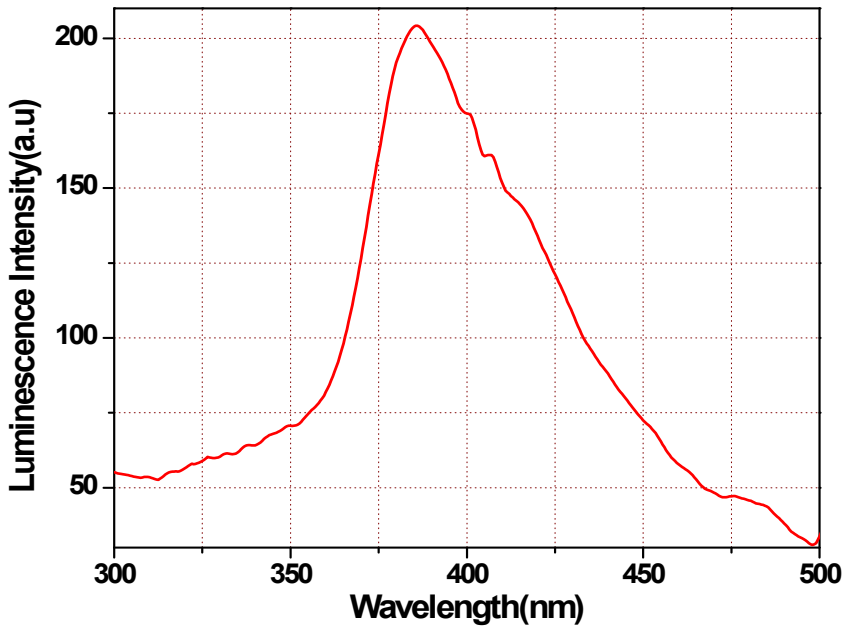


Figure S10: Emission spectrum of ZnO suspended in water (λ_{ex} = 260 nm). This spectrum is collected using PerkinElmer LS-55 spectrofluorometer.

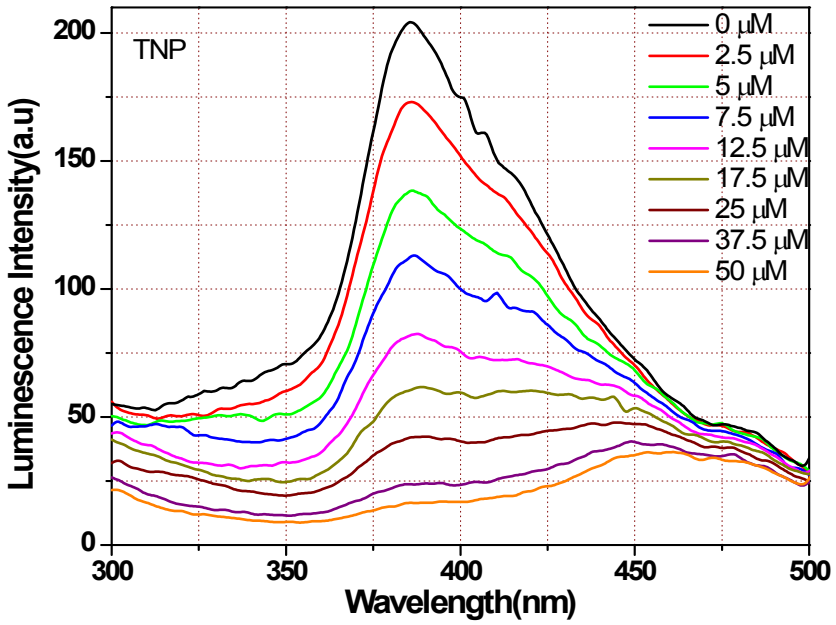


Figure S11: Emission spectra of ZnO suspended in water upon incremental addition of TNP solution (λ_{ex}= 260 nm). The final concentration of TNP in the medium is indicated in the legend.

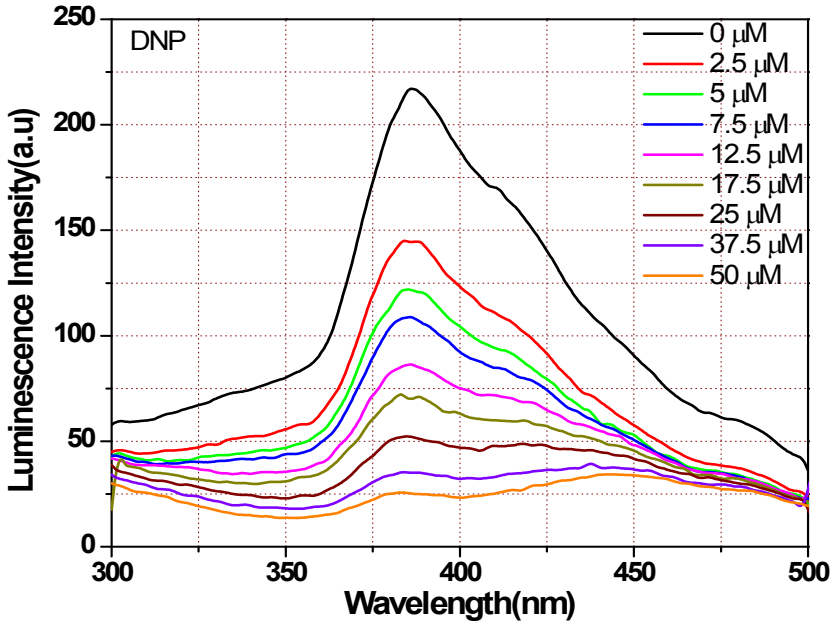


Figure S12: Emission spectra of ZnO suspended in water upon incremental addition of DNP solution (λ_{ex}= 260 nm). The final concentration of DNP in the medium is indicated in the legend.

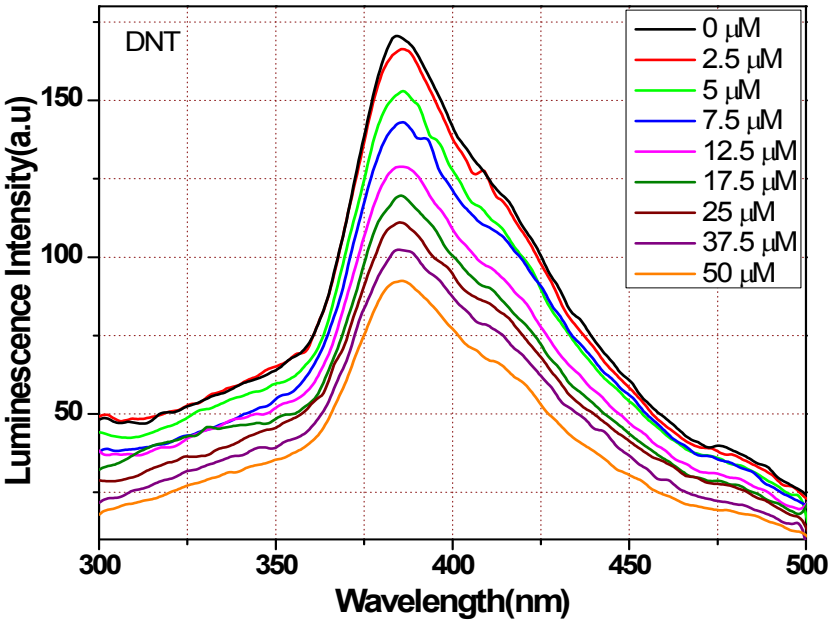


Figure S13: Emission spectra of ZnO suspended in water upon incremental addition of DNT solution (λ_{ex}= 260 nm). The final concentration of DNT in the medium is indicated in the legend.

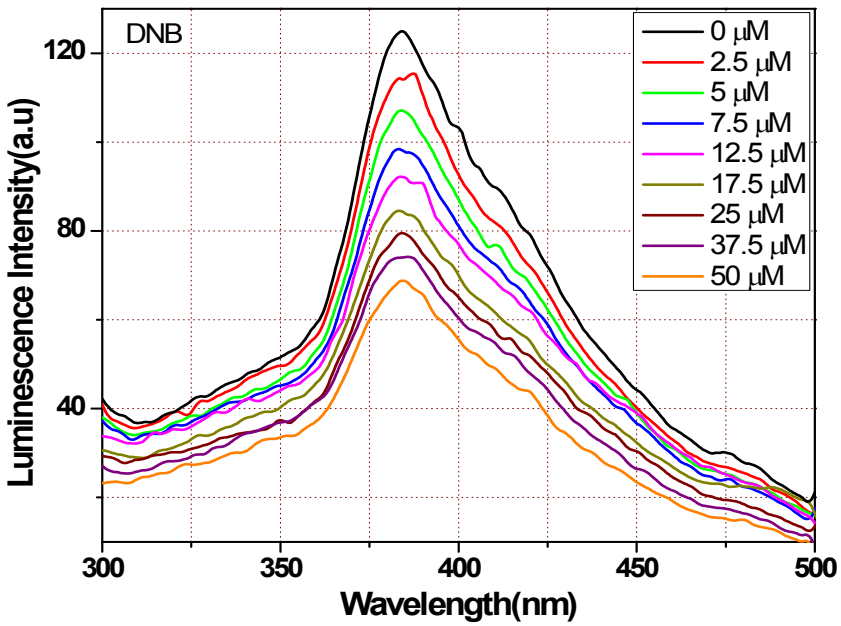


Figure S14: Emission spectra of ZnO suspended in water upon incremental addition of DNB solution (λ_{ex}= 260 nm). The final concentration of DNB in the medium is indicated in the legend.

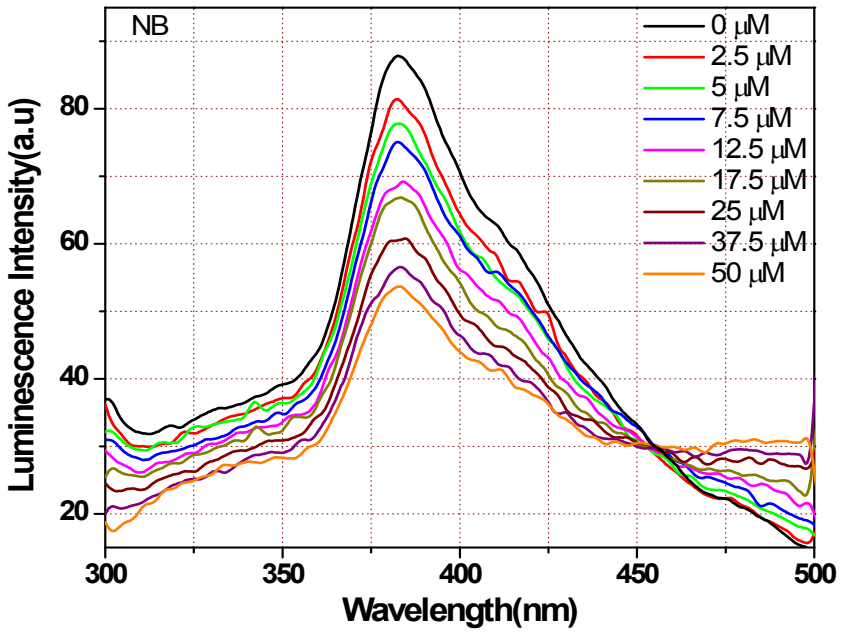


Figure S15: Emission spectra of ZnO suspended in water upon incremental addition of NB solution (λ_{ex}= 260 nm). The final concentration of NB in the medium is indicated in the legend.

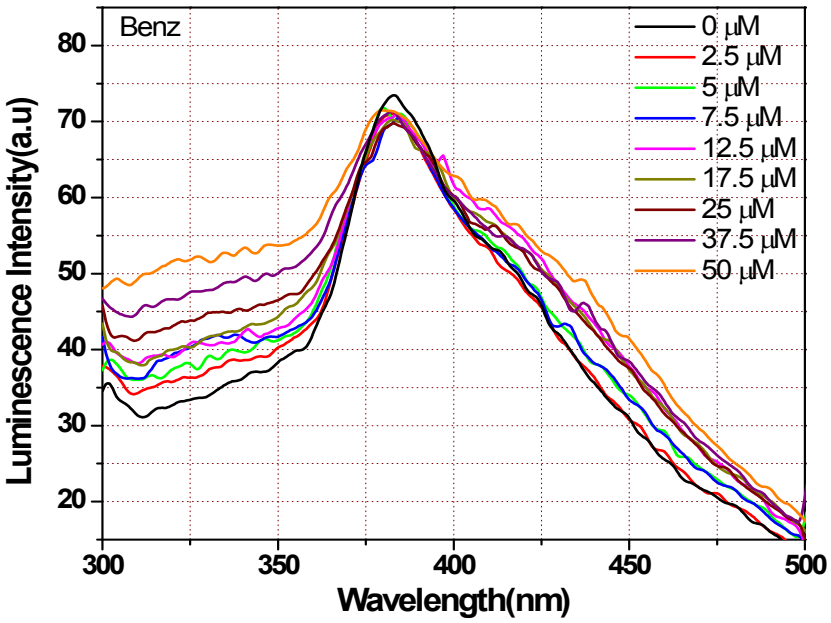


Figure S16: Emission spectra of ZnO suspended in water upon incremental addition of Benzene solution (λ_{ex}= 260 nm). The final concentration of Benzene in the medium is indicated in the legend.

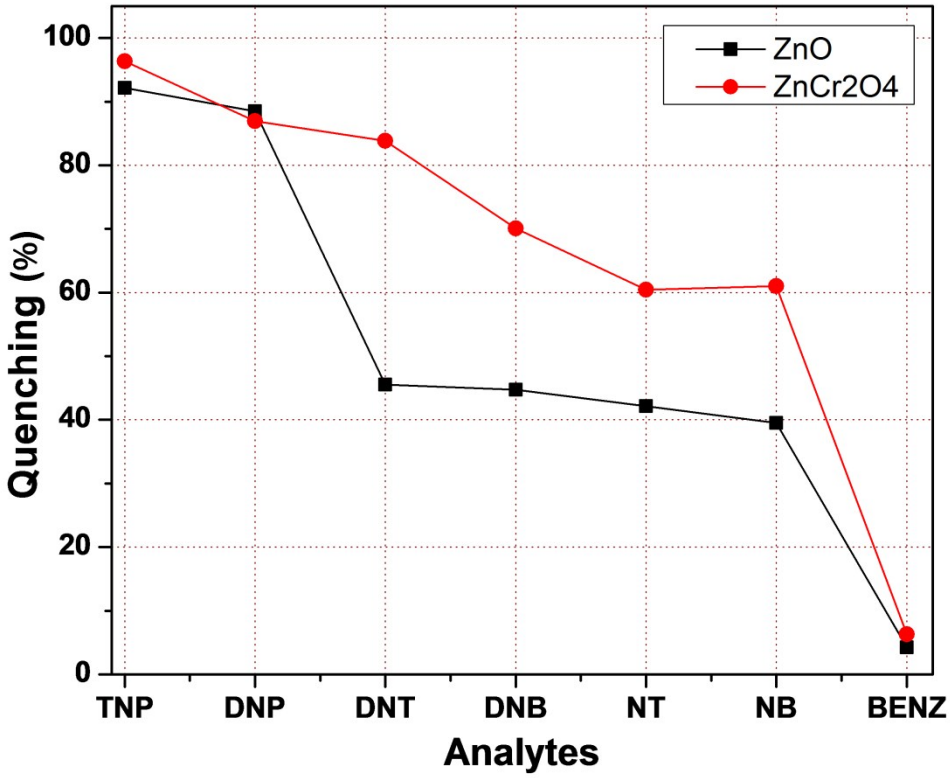


Figure S17: Percentage of quenching in presence analytes with 50 µM concentration for $ZnCr_2O_4$ and ZnO.

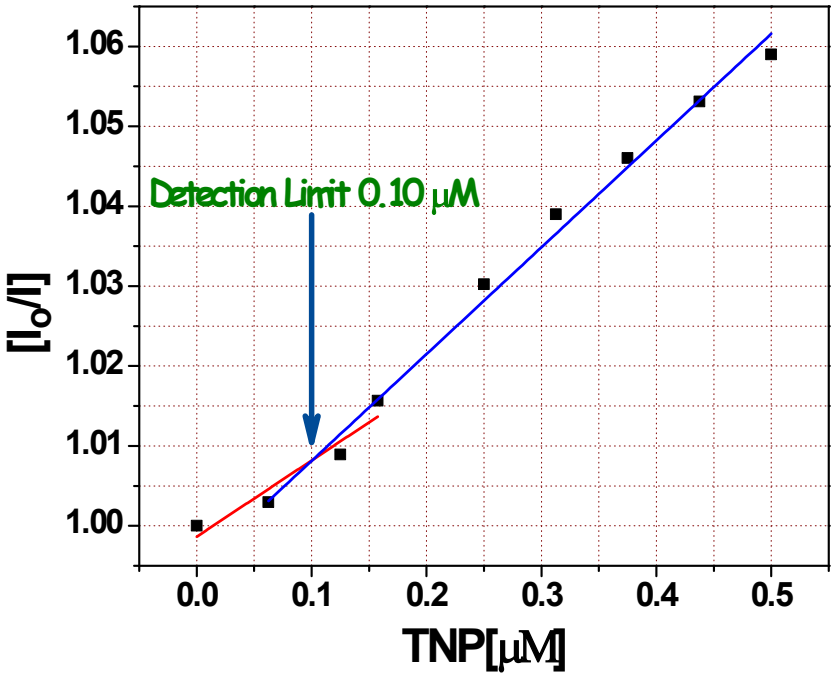


Figure S18: Plot of changes of luminescence intensity of nano-sized $ZnCr_2O_4$(at 410 nm) *vs* concentration of TNP indicating the detection limit (where I_0 and I are luminescence intensity in theabsence and in thepresence of TNP, respectively).

Table S1: Result of optical gap calculation in gas phase using B3LYP/6-31+G(d) level of theory using Gaussian 16.

Nitro-aromatics	HOMO (eV)	LUMO (eV)	$\Delta E = (E_{HOMO} - E_{LUMO})$	Peaks in experimental data of absorption spectra
TNP	-8.67645	-4.37509	-4.30136	2.92, 3.39 and 5.48
DNP	-8.00572	-3.77103	-4.23469	3.1, 3.47, 4.78, 5.46, 5.84
DNT	-8.42067	-3.42220	-4.99847	4.94
NT	-7.65498	-2.79092	-4.86406	4.36, 5.71
DNB	-8.73060	-3.59661	-5.13399	5.12
NB	-7.88709	-2.91310	-4.97399	4.64, 5.84