Electronic Supplementary Material (ESI) for Environmental Science: Nano.

Supplementary File

Two Dimensional Ion-Molecule Chelation Reaction (2D-IMCR) to form the two dimensional dual optical sensor (2D-DOS): synthesis and application of the Phen-SnO_2 nanosheets for fluorometric and colorimetric sensing for Nitro-aromatic explosives

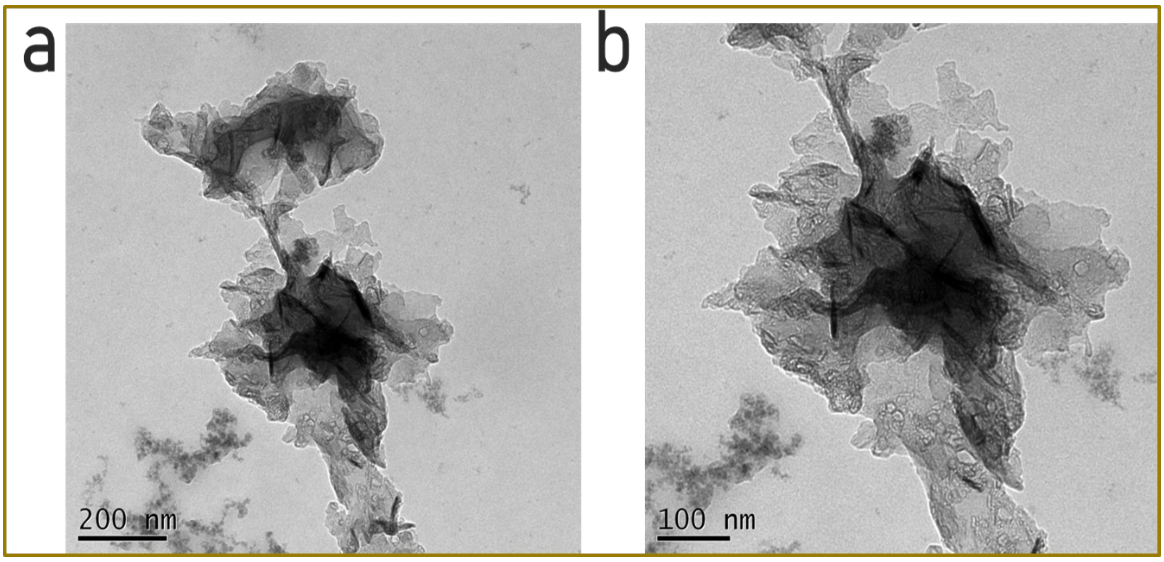

Figure. S1 TEM images for synthesized Phen-SnO_2 nanosheets.

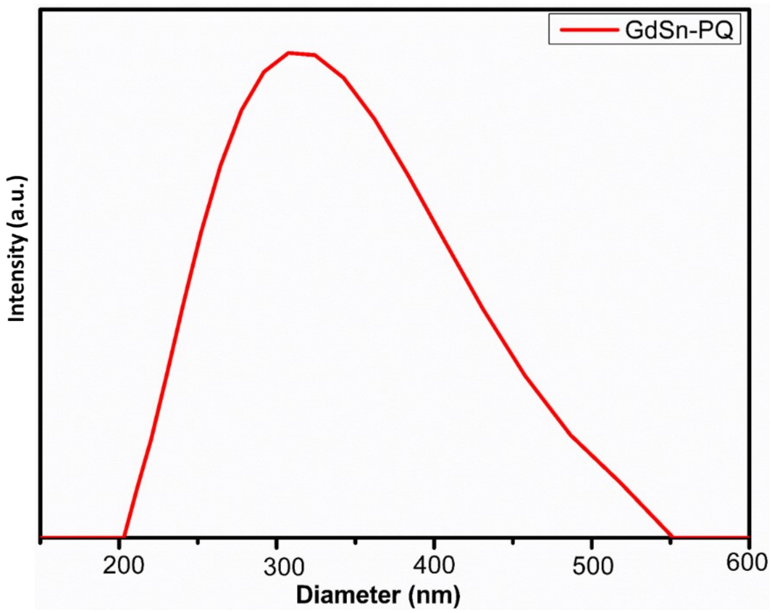

Figure. S2 DLS results for the synthesized Phen-SnO_2 nanosheets.

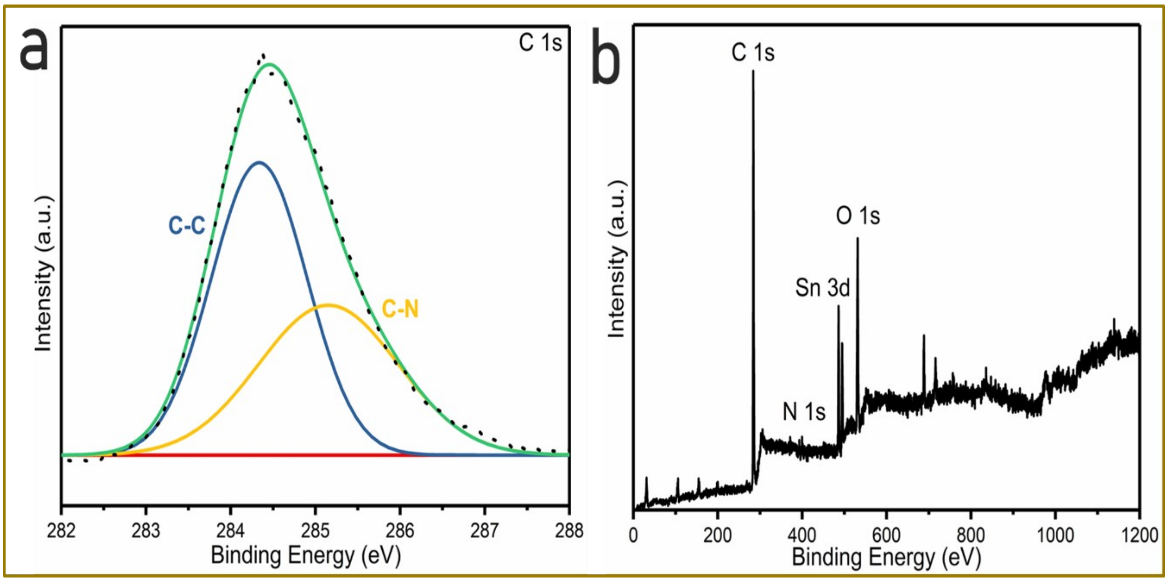

Figure. S3 XPS analysis for the synthesized Phen-SnO_2 nanosheets (a) C 1s spectra (b) XPS survey scan.

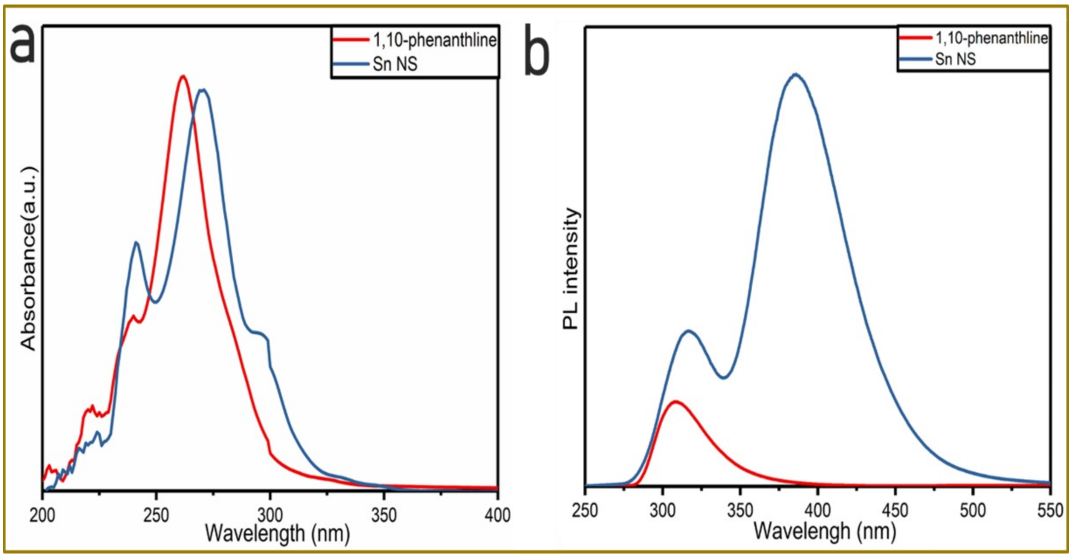

Figure. S4 UV and PL spectra for comparison of the Phen-SnO_2 nanosheets with the precursor molecule, 1,10- phenanthroline (Control).

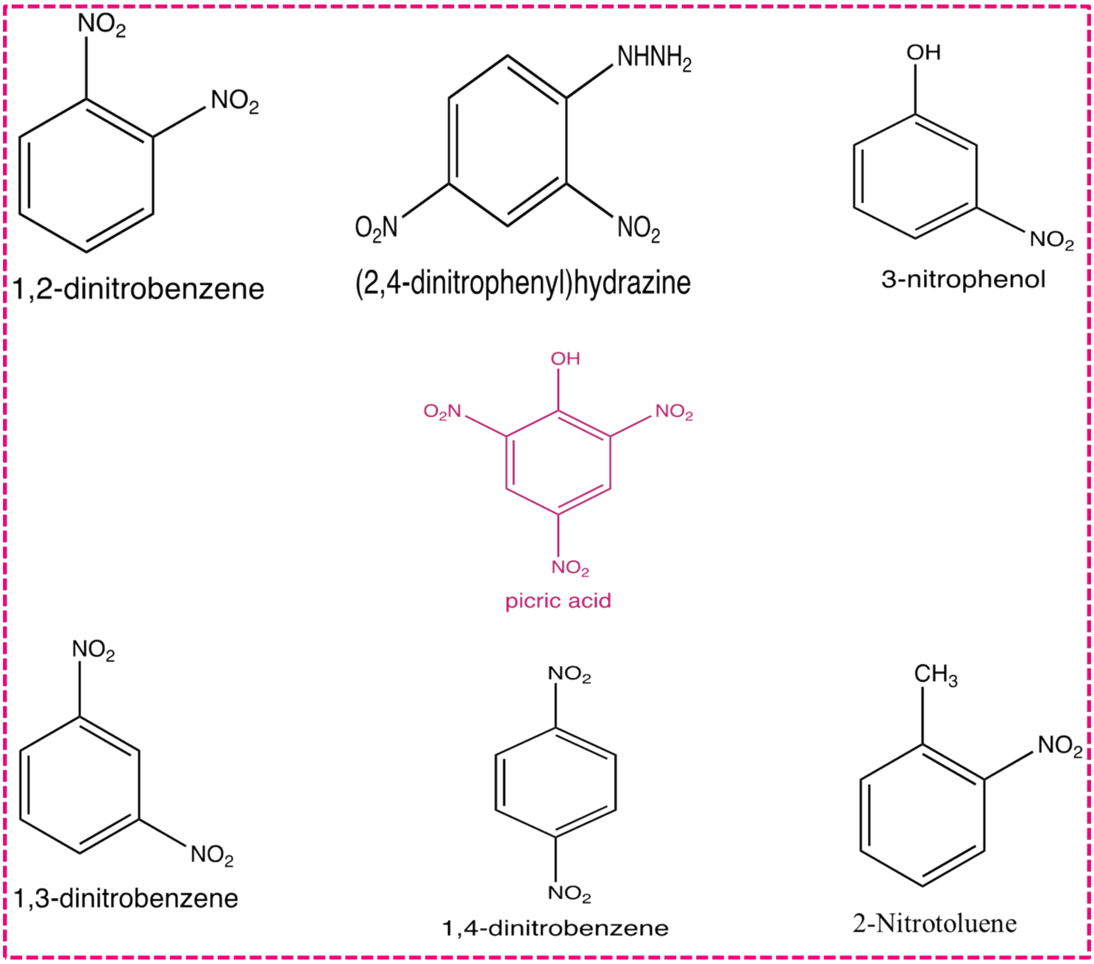

Figure. S5 Chemical structures of all NACs used for the application/detection studies.

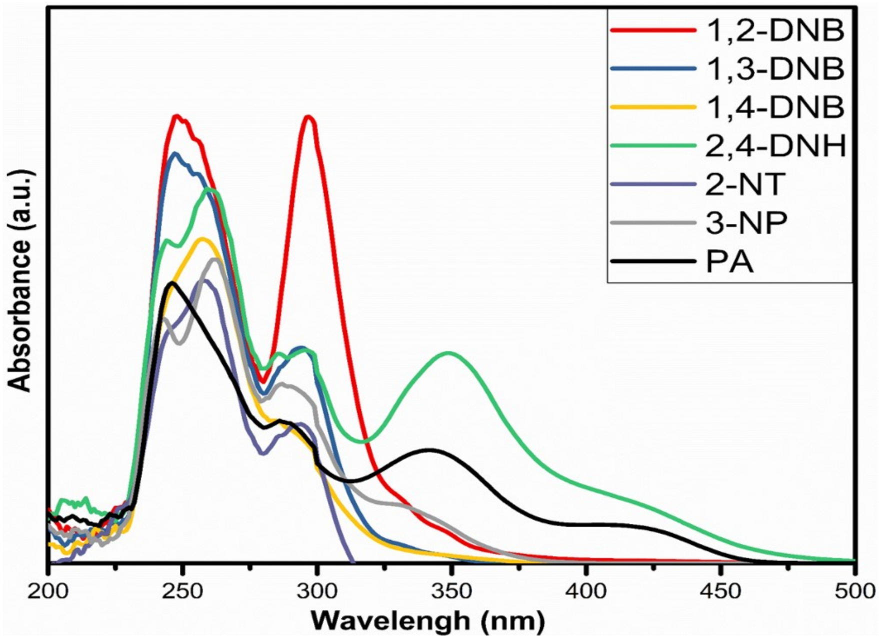

Figure. S6 UV absorbance data of all NACs prior to the addition of the Phen-SnO_2 nanosheets.

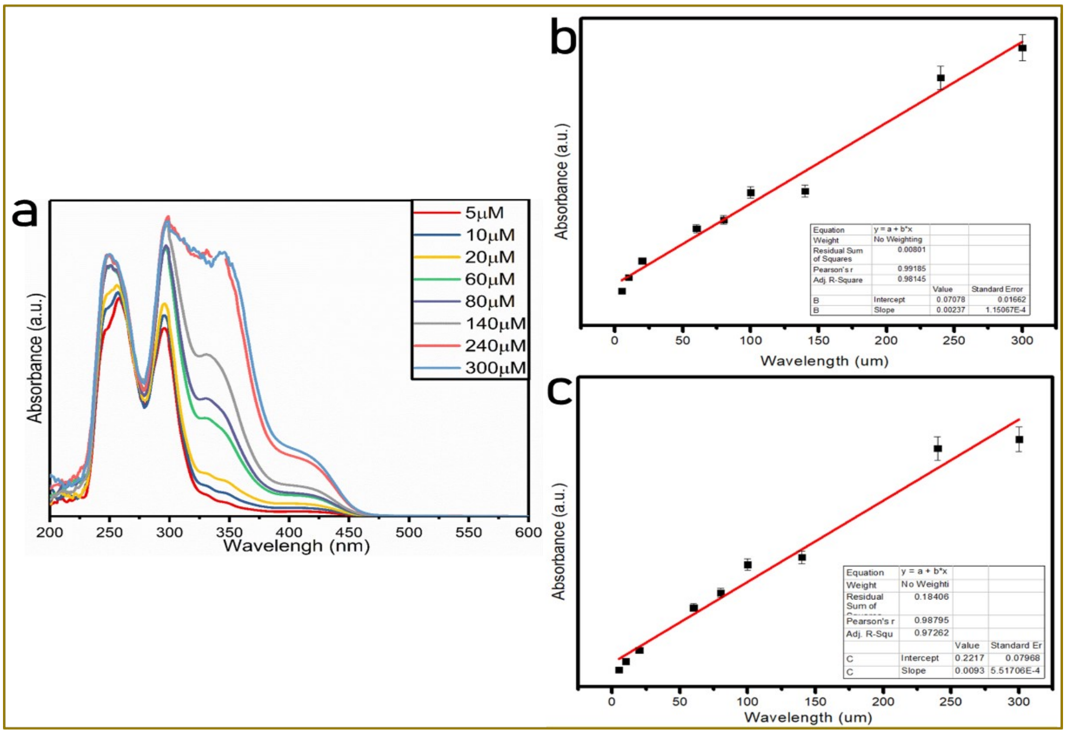

Figure. S7 Colorimetric detection of PA using the Phen-SnO_2 nanosheets

Calculation Section

LOD calculations for PA detection

	V*alue*	*Standard Error*
Intercept	***0.68135***	***0.87991***
Slope	***0.17804***	***0.00609***

LOD (PA): K x SD/S

K=3

SD= Intercept/1000 = 0.68/1000 = 0.00068

LOD (PA)= 3 x 0.00068/0.178 = 0.011 μM

Where,

K= Constant

SD= Standard Deviation of regression line

S= Slope

Table S1. Comparison table of different fluorescent probes with Phen-SnO_2 nanosheets for the detection of picric acid

Fluorescent Probe	Synthesis Route	Linear Range	Limit of Detection	Quenching Efficiency(%)	Ref
Carbon nanoparticles	Microwave Pyrolysis	0-20 µM	0.25 µM	75	1
N@CDs	Hydrothermal	1-75 µM	2.45 µM	-	2
Ni-OBA-Bpy-18 MOF/GCE	Sonication	0-300 µL	66.43 ppb	35	3
NCDs Malic acid and Urea	Microwave pyrolysis	0-1.6 µM	33nM	-	4
PFAM	Suzuki coupling polymerization	0-50 µM	57.8 nM	95	5
Hydrazine-substituted BODIPY	Stirring	0-40 µM	0.44 µM	65.14	6
palladium-based macro-cycles	Stirring	0−100µM	0.2 µM	60	7
,5-bis((E)-4-bromostyryl)-3,4-diphenylthiophen	Suzuki coupling andWittig−Horner reactio	40-440 µM	0.47 µM	-	8
supramolecular receptor	Click Chemsirty	0-47.6 µM	2.52 µM	-	9
Phen-SnO_2 Nanosheets	Probe Ultrasonication	0-300 µM	0.011 µM (11 nm)	99.92	This Work

References

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