Electronic Supplementary Material (ESI) for Analyst.

Ultra-sensitive gas phase detection of 2,4,6-Trinitrotoluene by non-covalently functionalized Graphene Field Effect Transistor

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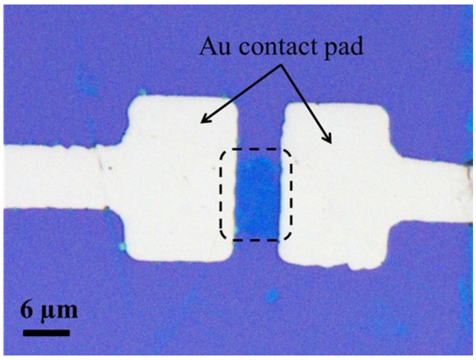

Figure S1. Optical image of GFET

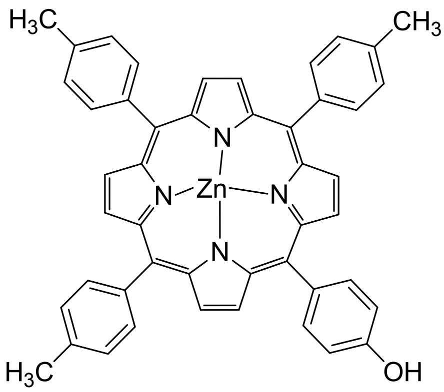

Figure S2. Chemical structure of ZnTTPOH.

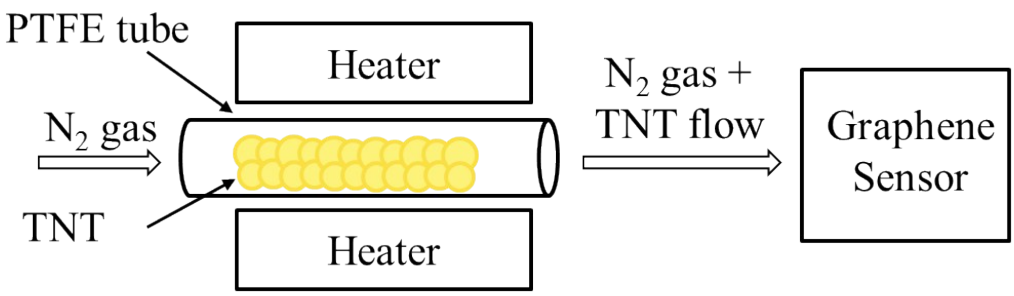

Figure S3. Vapor generator set-up

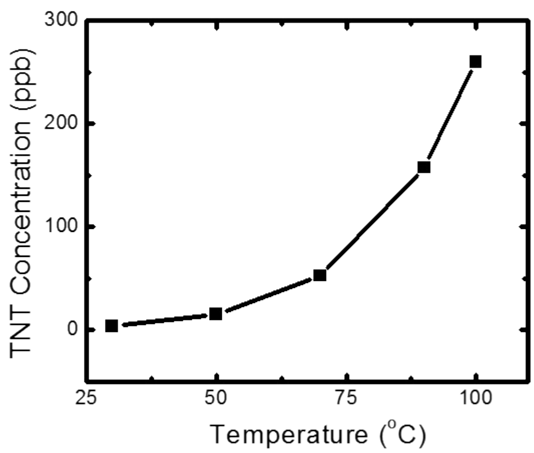

Figure S4. TNT concentration generated through vapor generator

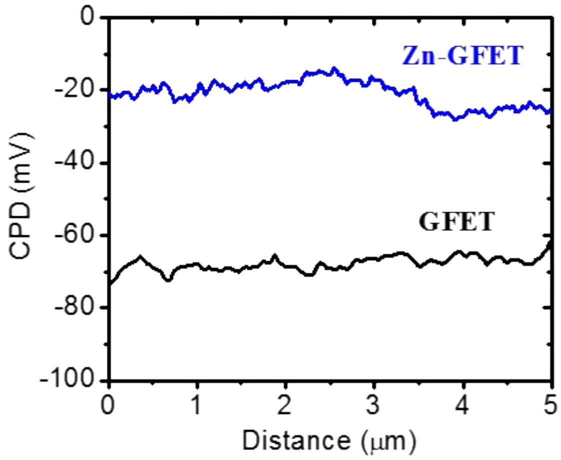

Figure S5. CPD plot for GFET and Zn-GFET

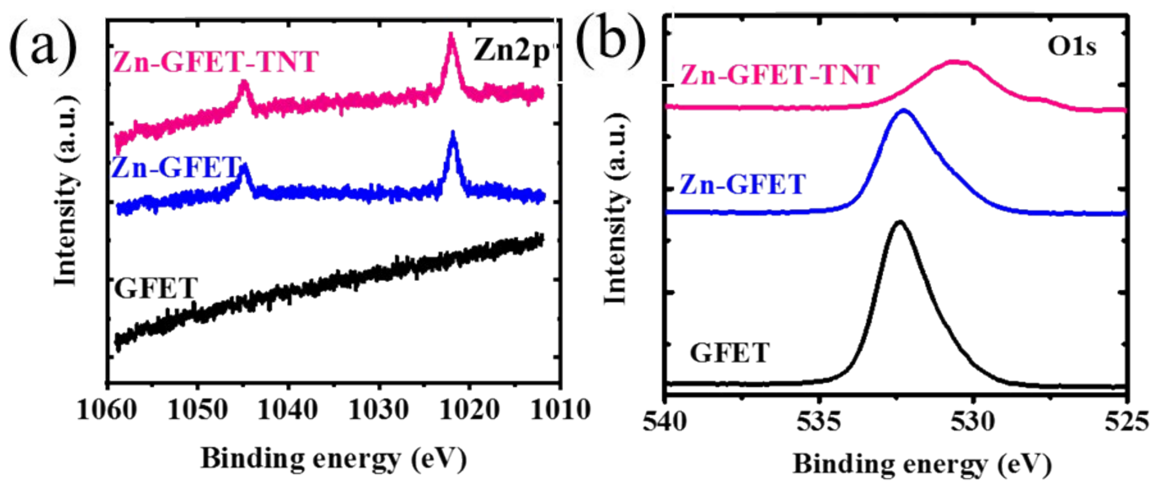

Figure S6. XPS spectra of (a) Zn2p peak (b) O1s peak

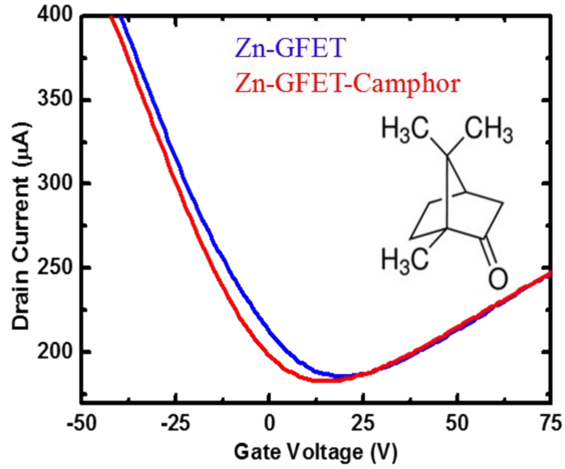

Figure S7. Drain current vs. gate voltage characteristics for Zn-GFET (curve in blue) after exposure to camphor (curve in red)

Table S1. Limit of detection, response time of various carbon-based and Porphyrin decorated sensing material

Ref.	Sensing material	Technique /Structure	Detection environment	LOD (Analyte)	Response time
1	Parylene-C-OFET	Electrical – Transistor based	Vapour in ambient	1.79 µg/cm^{2}s (TNT concentration)	~120 sec
2	Carbon nanotubes	SERS	Vapour phase in vacuum desiccator	-- (TNT)	Several hours
3	Silver Nanocubes	SERS	Vapour phase in sealed container	9 µM (DNT)	3 minutes
4	Hydrocarbon and nitrogen oxide(s)	Electrochemical potentiometric	Vapour phase	250 ng (TNT, PETN)	--
5	Hydrocarbon and nitrogen oxide(s)	Electrochemical	Vapor phase	1-3 µg (TNT, PETN, RDX)	--
6	Plasma modified Graphene	Electrochemical	Aqueous phase	20 ppb for TNT in phosphate buffered saline	--
7	Porphyrin-MOF	Fluorescence quenching	Aqueous phase	0.46 µM	30 sec
This work	Porphyrin functionalized graphene	Electrical – Transistor based	Vapor phase in ambient conditions and room temperature	4 ppb TNT	~ 40 sec

References

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