

Supporting Information

Low Conductive Electrodeposited Poly(2,5-dimethoxyaniline) as a Key Material in a Double Lateral Heterojunction, for Sub-ppm Ammonia Sensing in Humid Atmosphere

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	C(1s) / N(1s)	O(1s) / N(1s)	Cl(3p) / N(1s)	O(1s) / Cl(3p)
PDMA	8.4 (8)	4.8	0.7	4* (4)

* after subtraction of the oxygen contribution from the two methoxy groups

Figure S1. Measured atomic ratio from XPS spectra and theoretical values (in brackets) of a PDMA film

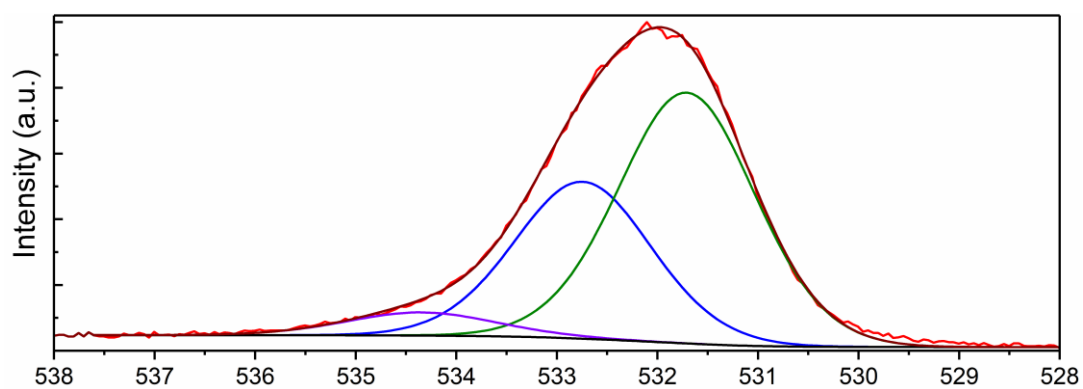


Figure S2. O(1s) XPS high resolution spectrum of PDMA.

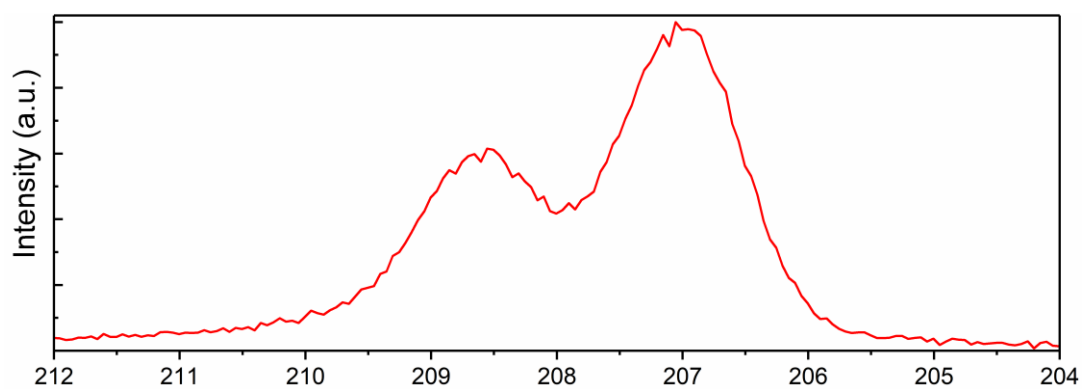


Figure S3. Cl(2p) XPS high resolution spectrum of PDMA.

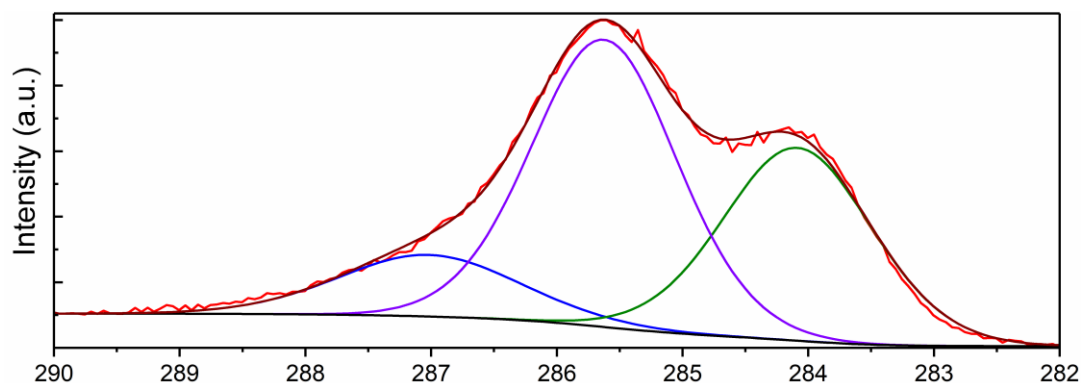


Figure S4. C(1s) XPS high resolution spectrum of PDMA.

The O(1s) spectrum decomposed in two major components at 531.7 and 532.7 eV, attributed to Cl-O bound from the perchlorate ions¹ and C-O-C from the methoxy groups,² respectively (Figure S2). The presence of perchlorate ions³ was also confirmed by the Cl(2p_{3/2}) peak at 207 eV (Figure S3). The C(1s) spectrum (Figure S4), centered at 285.6 eV, as previously observed,² revealed three contributions at 284.1, 285.6 and 287 eV attributed respectively to aromatic C=C, C-N and C-O bounds.

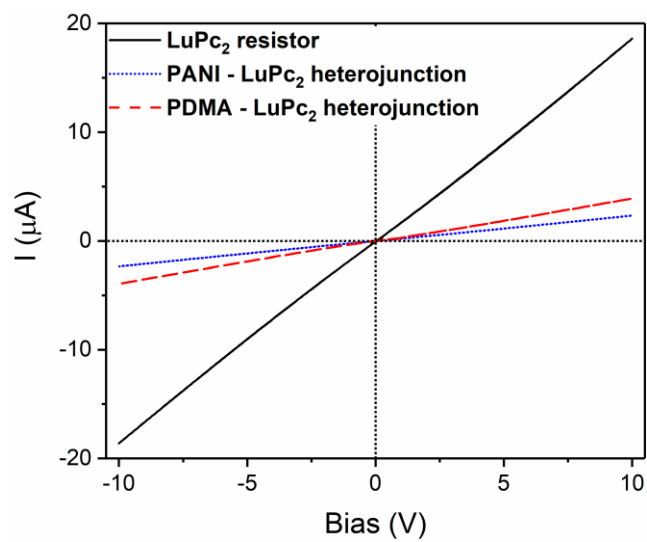


Figure S5. $I(V)$ characteristics in ambient atmosphere of PANI-DLH (blue dotted line), PDMA-DLH (red dashed line) and a LuPc₂ resistor (black solid line).

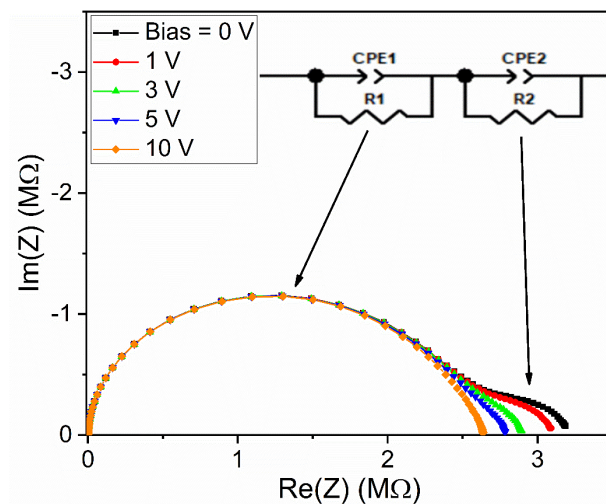


Figure S6. Nyquist plot as a function of the bias (from 0 V to 10 V) of the impedance spectrum of PANI-DLH.

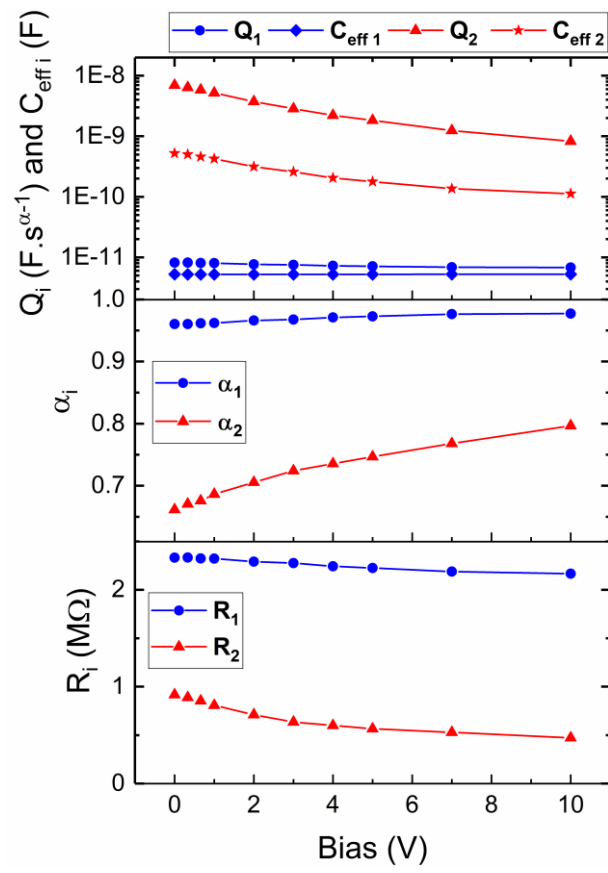


Figure S7. Variation of the extracted circuit parameters as a function of the bias for PANI-DLH.

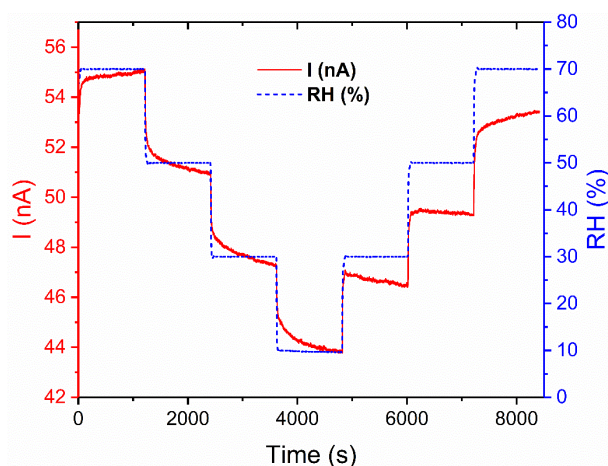


Figure S8. Current response of PDMA-DLH during exposure to relative humidity in the range 10-70 %.

References

- (1) Schnyder, B.; Alliata, D.; Kötzt, R.; Siegenthaler, H. Electrochemical intercalation of perchlorate ions in HOPG: an SFM/LFM and XPS study. *Appl. Surf. Sci.* **2001**, *173* (3-4), 221–232.
- (2) Roy, B. C.; Gupta, M. D.; Bhowmik, L.; Ray, J. K. Synthesis and characterization of poly(2,5-dimethoxyaniline) and poly(aniline-co-2,5-dimethoxyaniline): the processable conducting polymers. *Bull. Mater. Sci.* **2001**, *24* (4), 389–396.
- (3) Amin, M. A. Metastable and stable pitting events on Al induced by chlorate and perchlorate anions—polarization, XPS and SEM Studies. *Electrochim. Acta* **2009**, *54* (6), 1857–1863.