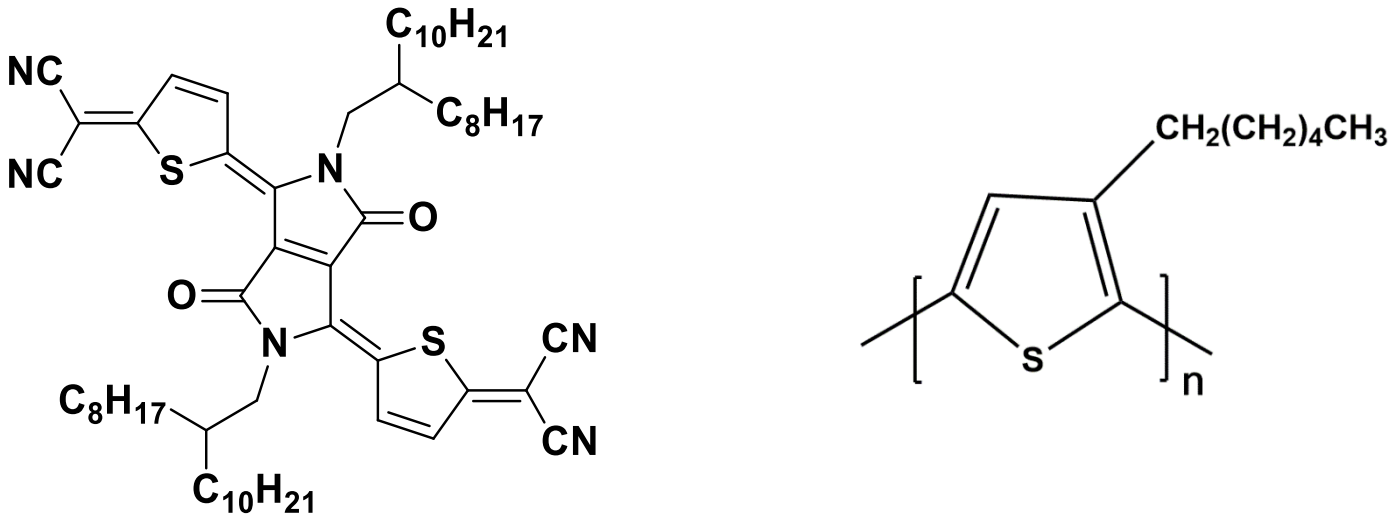
Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supplementary Information for "Flexible Organic Inverter Made from Printable Materials with Synergistic Ammonia Sensing"



SI Figure 1. Chemical composition of (left) (2,2'-[(2,5-dihexadecyl-3,6-dioxo-2,3,5,6-tetrahydropyrrolo[3,4-c]pyrrole-1,4-diylidene)dithiene-5,2-diyli-dene]dimalononitrile (DPPCN) and (right) Poly(3-hexylthiophene-2,5-diyl) (P3HT), N and P type semiconductors, respectively.

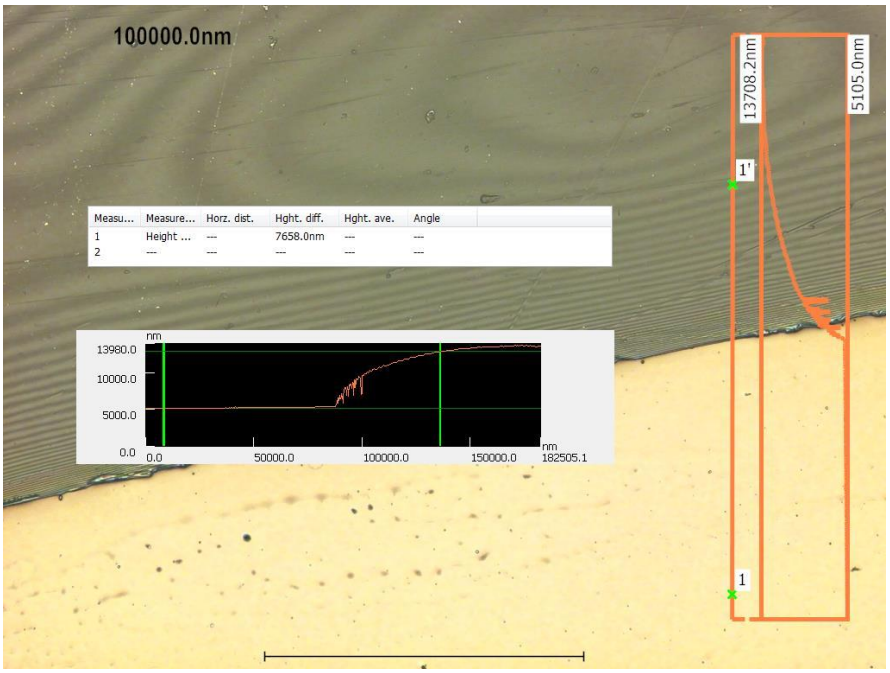


Figure a: Bilayer height calculation

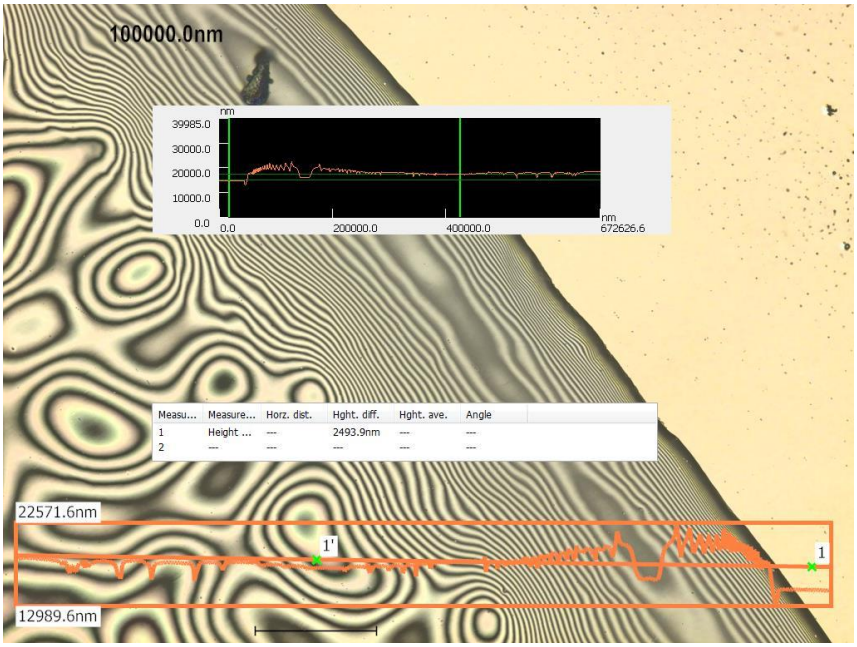


Figure b: PHPMA height calculation

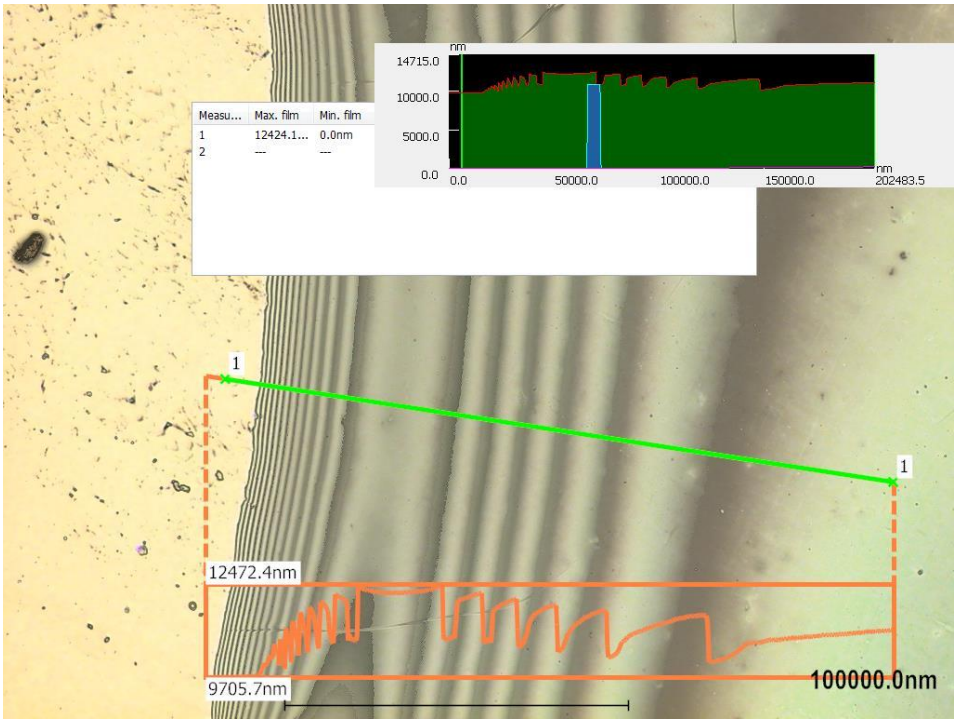


Figure c: PS height calculation

SI Figure 2: Film morphologies at edges and height calculation to ensure increased height (rather than dissolution of bottom layer) using optical laser microscope software.

Run Description:	.5 ppm 5 min	.5 ppm 10 min	.5 ppm 20 min	1 ppm 5 min	5 ppm 5 min
Switching	5.33	11.1	11.6	9.09	24.2
voltage	4.73	13.5	22.3	8.3	25.9
shift	8.5	18.4	23.2	10.14	18.7
(V)	10.5		22.1		
			18.8		
Average:	7.27	14.33	19.60	9.18	22.93
St dev:	2.72	3.72	4.77	0.92	3.76
Calculated p value using student t test:				0.011467	

SI Figure 3: Switching voltage shift data from Figure 3 in numeric form with calculations shown.

Limit of Blank and Limit of Detection were calculated according to Armbruster's explanation,

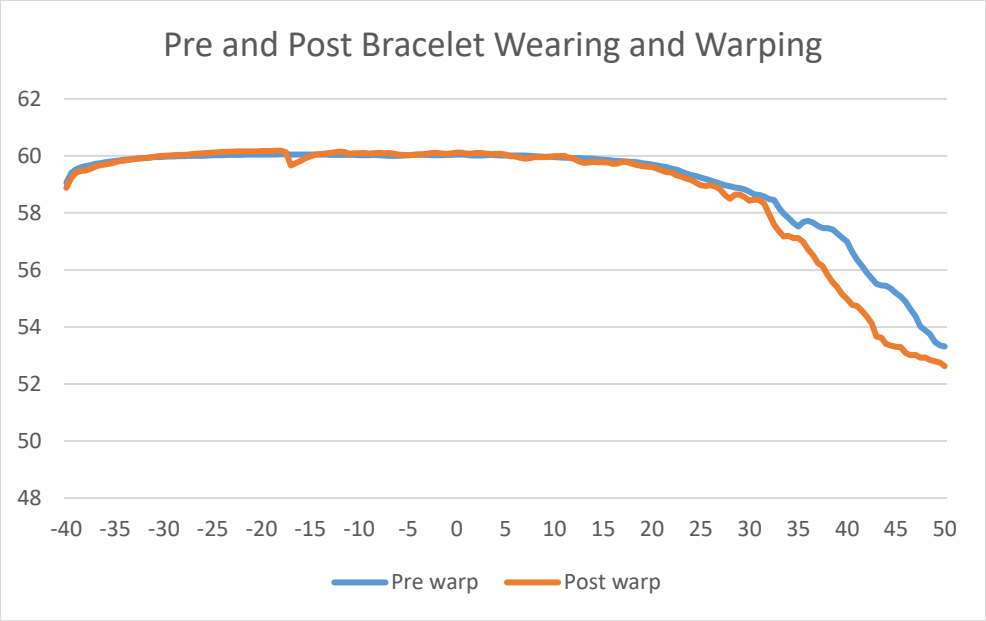
using dry air exposure as our blank and the 0.5 ppm ammonia exposures as our example of

"low concentration". The limit of blank (LoB) is the highest apparent analyte concentration found based on changes in switching voltage shift, defined as LoB = $mean_{blank}$ + 1.645(SD_{blank}). Limit of Detection is the lowest analyte concentration that can be differentiated from our blank samples. LoD = LoB + 1.645($SD_{\text{low concentration sample}}$)

ppm	Average Shift	Std Dev	Corrected changes subtracting LOB shift due to dry air exposure->	
0.5	7.265	2.71	1.8165	1.625
1	9.17	0.923		3.53
5	22.93	3.76		17.29
time (min) for .5 ppm				
5	8.11	2.6		2.47
10	14.3	3.72		8.66
20	19.6	4.77		13.96

LoB= 5.64 V
LoD= 8.63 V (relying on StDev of both 0.5 and 1.0 ppm ammonia as "low concentration")
This LoD corresponds to approximately 1 ppm ammonia at 5 minutes, or 0.5 ppm ammonia at ten minutes.

SI Figure 4: Limit of Blank (LOB) and Limit of Detection (LOD) calculations based on standard methods comparing a blank (dry nitrogen flow) to low concentrations of ammonia.



SI Figure 5: Input-Output curve of Pre and Post "bracelet" wearing and warping.

(-V) Shift				
Solvent	Run 1	Run 2	Run 3	Average
Toluene	28.4	18.06	20.36	22.27
Acetone	22.56	19.9	16.06	19.51
Ethyl Acetate	12	12.7	15.9	13.53
Methanol	28.9	33.6	8.6	23.70

SI Figure 6: Switching voltage shifts due to near saturation solvent conditions.