Electronic Supplementary Material (ESI) for RSC Advances.
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Supplementary Section

S1.0 Monomers

The chemical structures of monomers used for this work are:

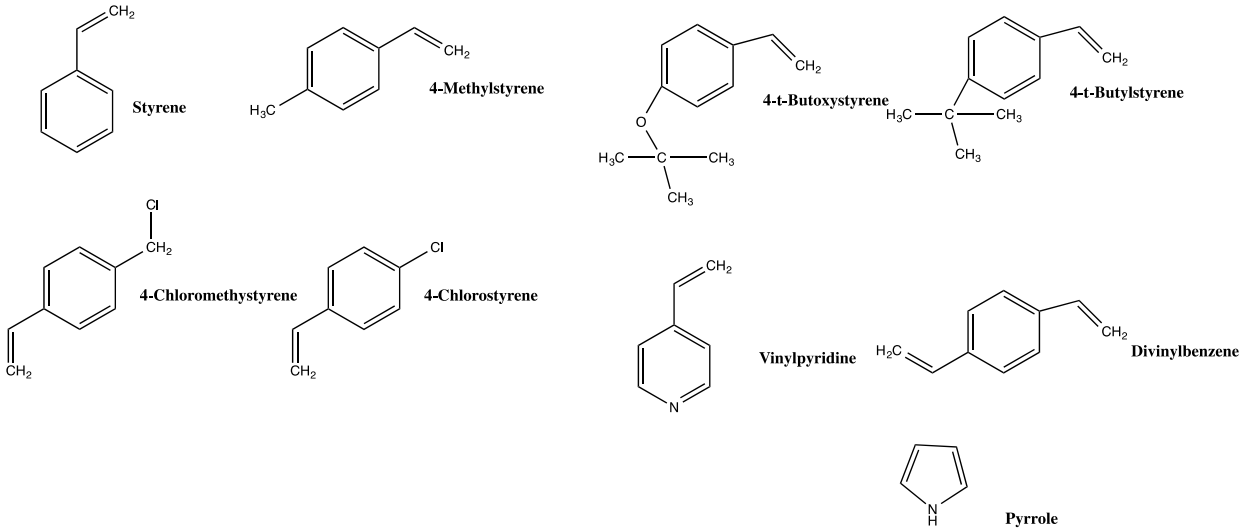

Fig. S1 Structures of monomers used for electrodeposition of copolymer sensor array

S2.0 As-Grown Copolymer

The resistance response of a prototype PPy-co-PDVB copolymer sensor films were grown onto IDE's seven-sensor paths and characterized with small organic vapors and water to observe their variable responses to analytes. As observed from the plot of their average normalized resistance response to analytes, it is obvious that the sensitivity of this sensor vary significantly with the type of analyte. Methanol tends to partition into the sensor with higher response signals, which may be due to its ability to form H-bonding with the CP sensor.

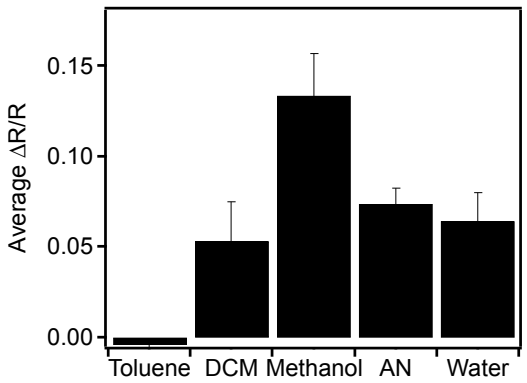

Fig. S2. Average ΔR/R resistance response pattern for the exposure of PPy- co-PDVB (as deposited) to all-five analytes. The error bars represent the magnitude of SD values for randomly exposed analytes.

S3.0 XPS

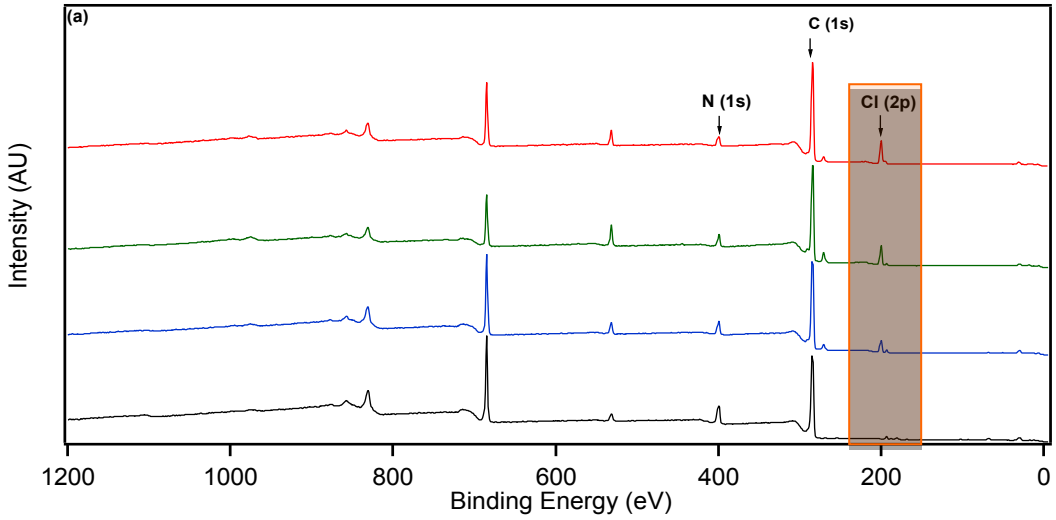

Fig. S3. Survey-scan of PPy film (black) and poly(pyrrole-co-4-chlorostyrene) films grown at different oxidation potentials. The Cl 2p peaks increases proportionately with growth potential while PPy film do not show this peak.

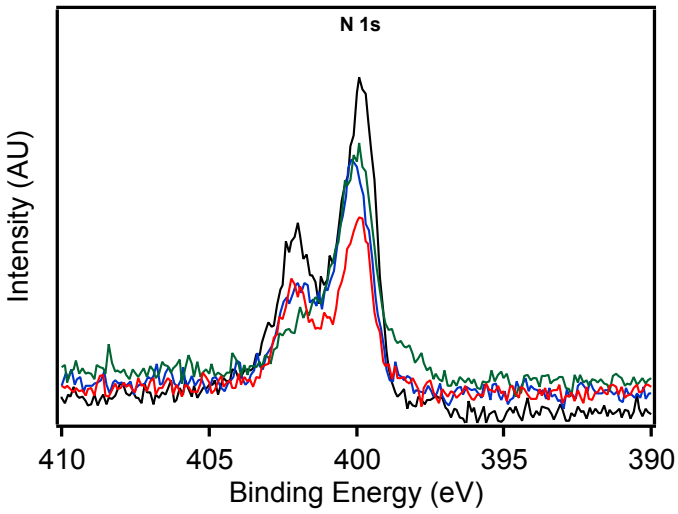

Fig. S4. High resolution N 1s region X-ray photoelectron spectra of electrodeposited poly-pyrrole-co-chlorostyrene films grown at varied growth potential (a) 1.8 V, (b) 1.5 V (c) 1.2 V and (d) pyrrole at 1.2 V

Table S1: Concentration of analytes in nitrogen carrier gas based on their vapor pressures. The flow rate of N_2 (g) is fixed at 380 sccm, while the pressure of the mixing analyte is 20 sccm (5%), to obtain a total gas-mixture pressure of 400 sccm. The vapor pressures of the analytes[32,33] are assumed to be similar to the values shown in the table.

Analytes	Analyte vapor pressure at 25 ^{0}C (mmHg)[a]	Analyte concentration (ppth)
Toluene	25.47	1.68
Dichloromethane	300.05	20.28
Acetonitrile	84.95	5.79
Methanol	119.98	8.09
Ethanol	58.9	4.58
Isopropanol	33.1	2.57
Water	23.37	1.57
Jet A	3.7	0.29
AVG	278.2	20.94
Petrol	775.6	54.27
Kerosene	0.28	0.021
Diesel	10.3	0.807

[a] see refs. 32 and 33

Table S2. Resolution factors showing numerical separation between sensor pairs

	PPy1	PPy2	PPy3	PS1	PS2	PS3	PmS1	PmS2	PmS3	PCS1	PCS2	PCS3	PCmS1	PCmS2	PCmS3	PtBS1	PtBS2	PtBS3	PtB-o-S1	PtB-o-S2	PtB-o-S3	PDVB1	PDVB2	PDVB3	PVP1	PVP2	PVP3
PPy1	1.0	11.4	16.1	6.8	8.0	8.7	6.8	7.2	7.8	7.0	6.0	5.5	7.4	8.6	8.3	7.4	8.2	8.8	7.4	5.1	7.4	5.9	6.7	9.5	10.7	5.3	4.8
PPy2		1.0	8.7	18.2	20.2	20.4	15.9	13.6	18.9	13.4	15.6	16.2	22.9	17.4	18.5	19.2	21.0	9.4	8.5	18.2	14.9	15.9	17.6	19.9	21.0	5.3	11.3
PPy3			1.0	36.0	32.0	38.2	57.5	47.5	47.3	21.8	13.7	38.2	39.9	38.7	37.4	37.4	22.0	45.8	43.0	70.9	37.0	35.3	40.4	3.5	41.9	5.7	14.0
PS1				1.0	6.3	3.6	11.6	9.1	9.3	6.4	5.0	7.5	6.2	10.5	12.1	5.9	5.8	5.8	5.1	6.2	9.2	5.4	8.0	15.2	8.1	10.4	7.0
PS2					1.0	10.9	46.3	8.5	9.2	14.2	30.0	21.3	14.6	13.8	40.2	8.3	9.3	5.1	49.3	25.0	11.3	15.1	23.8	16.1	10.9	9.0	6.6
PS3						1.0	36.0	17.6	18.5	24.1	24.0	20.6	12.0	8.7	17.4	21.0	1.7	35.3	27.5	18.6	11.7	10.0	24.6	17.0	8.9	9.5	7.3
PmS1							1.0	15.3	17.6	18.1	7.6	11.9	8.2	18.2	10.5	31.7	17.3	3.3	25.0	12.0	11.1	7.7	26.0	23.8	39.4	19.8	6.4
PmS2								1.0	1.9	7.7	0.2	6.2	10.9	3.8	7.4	10.0	13.3	3.4	11.3	8.0	10.5	5.3	15.1	17.6	21.5	3.7	8.0
PmS3									1.0	2.8	14.3	6.7	20.8	5.2	8.1	12.8	25.2	3.2	15.4	11.1	4.3	5.9	18.5	6.2	20.4	9.7	6.5
PCS1										1.0	4.0	7.1	13.7	9.8	14.0	7.5	4.4	9.7	14.0	8.3	9.3	4.6	15.8	14.2	23.6	4.6	6.1
PCS2											1.0	10.4	9.6	13.1	10.1	8.2	19.4	15.2	14.7	8.7	8.6	4.5	31.8	14.6	18.4	3.8	5.6
PCS3												1.0	11.5	9.1	7.8	13.5	10.0	8.9	13.2	9.3	6.8	5.7	9.2	10.8	25.2	5.8	4.7
PCmS1													1.0	9.4	12.3	13.2	13.9	30.5	13.8	7.9	10.5	7.6	18.5	15.1	16.1	6.8	6.6
PCmS2														1.0	5.8	14.7	7.4	5.0	13.2	10.2	13.6	7.8	15.8	25.9	19.0	16.3	7.5
PCmS3															1.0	9.4	0.3	2.5	9.4	12.5	9.1	6.4	22.1	20.3	16.7	13.7	6.9
PtBS1																1.0	1.0	4.8	29.2	9.3	9.2	5.3	14.4	11.9	8.2	6.9	6.4
PtBS2																	1.0	5.0	19.0	11.1	11.6	6.4	1.4	17.7	19.8	10.9	6.8
PtBS3																		1.0	9.0	2.9	11.4	5.8	35.3	20.7	1.8	6.5	7.2
PtB-o-S1																			1.0	13.2	6.5	7.2	18.0	13.6	53.8	4.3	4.7
PtB-o-S2																				1.0	12.4	5.4	14.0	16.9	25.1	3.6	7.1
PtB-o-S3																					1.0	8.7	9.0	12.6	13.7	4.1	3.5
PDVB1																						1.0	15.8	10.2	19.1	10.8	5.1
PDVB2																							1.0	9.4	37.0	6.7	5.3
PDVB3																								1.0	16.4	8.6	6.5
PVP1																									1.0	10.4	8.1
PVP2																										1.0	2.7
PVP3																											1.0