

Supporting Information for:

Cross-Reactive, Self-encoded Polymer Film Arrays for Sensor Applications

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TITLE RUNNING HEAD: Self-encoded polymer film sensor arrays

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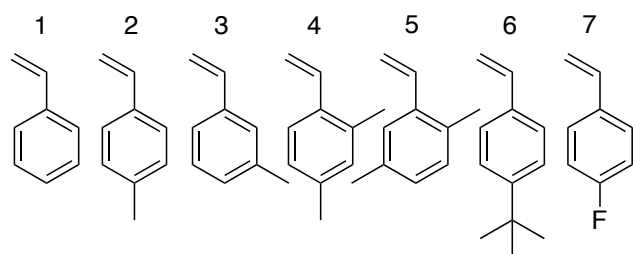


Figure S1. Molecular structure of seven different monomers used for the fabrication of the barcoded copolymers. Monomer 7 is present in all the polymers.

Table S1. Each of the 64 polymers synthesized is composed of the monomers listed. The ratios of each monomer within each polymer are given in Table S2.

	1	2	3	4	5	6	7	8
A	1	2	3	4	5	7	12	13
B	14	15	16	23	24	25	26	34
C	35	36	45	46	56	123	124	125
D	126	134	135	136	145	146	156	234
E	235	236	245	246	256	345	346	356
F	456	3456	2456	2356	2346	2345	1456	1356
G	1346	1345	1256	1246	1245	1236	1235	1234
H	23456	13456	12456	12356	12346	12345	123456	

Note: All the copolymers include ca. 10% w/w of monomer 7. If more than one monomer was present in a given copolymer, their content is equally weighted. For example, a polymer containing 2 monomers in addition to monomer 7, will be composed of 45% w/w of each of the two styrene monomers and 10% of monomer 7.

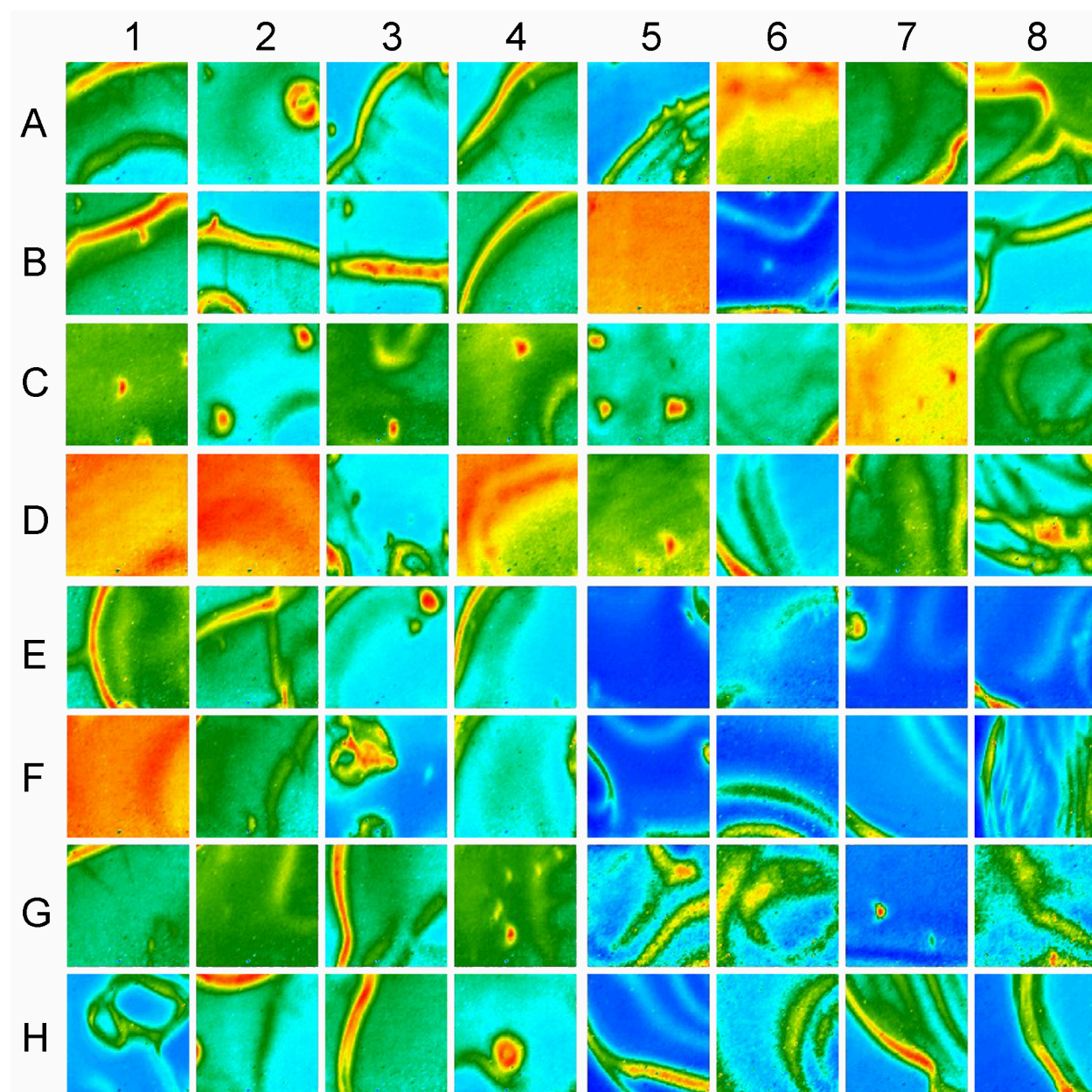
Table S2. Weight percent composition of the polymers

Reference	Polymer	1	2	3	4	5	6	7	Total
1	A1	89.1	0	0	0	0	0	0	100
2	A2	0	0	89	0	0	0	11	100
3	A3	0	0	0	0	0	89	11	100
4	A4	0	0	0	89.1	0	0	10.9	100
5	A5	0	89.1	0	0	0	0	10.9	100
6	A6	0	0	0	0	88.7	0	11.3	100
7	A7	44.8	0	44.2	0	0	0	10.9	100
8	A8	44.8	0	0	0	0	44.2	10.9	100
9	B1	44.6	0	0	44.5	0	0	10.9	100
10	B2	44.7	44.4	0	0	0	0	10.9	100
11	B3	45.3	0	0	0	43.6	0	11.1	100
12	B4	0	0	44.5	0	0	44.5	11.1	100
13	B5	0	0	44.3	44.7	0	0	11	100
14	B6	0	44.7	44.3	0	0	0	11	100
15	B7	0	0	45	0	43.9	0	11.1	100
16	B8	0	0	0	44.7	0	44.3	11	100
17	C1	0	44.7	0	0	0	44.3	11	100
18	C2	0	0	0	0	43.9	45	11.1	100
19	C3	0	44.5	0	0	44.6	0	11.1	100
20	C4	0	0	0	45.2	43.7	0	11.1	100
21	C5	0	45.2	0	0	43.7	0	11	100
22	C6	26.9	0	29.5	0	0	29.5	11	100
23	C7	29.9	0	29.5	29.8	0	0	10.9	100
24	C8	29.9	29.7	29.5	0	0	0	10.9	100
25	D1	30.2	0	29.8	0	29	0	11	100
26	D2	29.9	0	0	29.8	0	29.5	10.9	100
27	D3	29.9	29.7	0	0	0	29.5	10.9	100
28	D4	30.2	0	0	0	29	29.8	11	100
29	D5	29.8	29.6	0	29.7	0	0	10.9	100
30	D6	30.1	0	0	30	28.9	0	11	100
31	D7	30.1	29.9	0	0	29	0	11	100
32	D8	0	0	29.6	29.9	0	29.6	11	100
33	E1	0	29.8	29.6	0	0	29.6	11	100
34	E2	0	0	29.9	0	29.1	29.9	11.1	100
35	E3	0	29.7	29.6	29.8	0	0	10.9	100
36	E4	0	0	29.8	30.1	29.1	0	11.1	100

37	E5	0	30	29.8	0	29.1	0	11.1	100
38	E6	0	29.7	0	29.8	0	29.6	10.9	100
39	E7	0	0	0	30.1	29.1	29.9	11.1	100
40	E8	0	30	0	0	29.1	29.8	11.1	100
41	F1	0	30	0	30	29	0	11	100
42	F2	0	22.5	0	22.5	21.7	22.3	11	100
43	F3	0	22.5	22.3	22.5	21.7	0	11	100
44	F4	0	22.5	22.3	0	21.8	22.3	11	100
45	F5	0	0	22.3	22.5	21.8	22.3	11	100
46	F6	0	22.3	22.2	22.4	21.7	0	11	100
47	F7	22.5	22.4	0	22.4	21.7	0	11	100
48	F8	22.6	22.4	0	0	21.7	22.3	11	100
49	G1	22.6	0	0	22.5	21.7	22.3	11	100
50	G2	22.4	22.3	0	22.3	0	21.1	10.9	100
51	G3	22.6	22.4	22.3	0	21.7	0	11	100
52	G4	22.6	0	22.3	22.5	21.7	0	11	100
53	G5	22.4	22.3	22.1	22.3	0	0	10.9	100
54	G6	22.6	0	22.3	0	21.8	22.3	11	100
55	G7	22.4	22.3	22.1	0	0	22.1	11	100
56	G8	22.4	0	22.1	22.4	0	22.1	10.9	100
57	H1	0	18	17.8	18	17.4	17.8	11	100
58	H2	18	17.9	0	18	17.3	17.8	11	100
59	H3	18	17.9	17.8	18	17.3	0	11	100
60	H4	18	17.9	17.8	0	17.4	17.8	11	100
61	H5	18	0	17.8	18	17.4	17.8	11	100
62	H6	17.9	17.8	17.7	17.9	0	17.7	10.9	100
63	H7	15	14.9	14.8	15	14.5	14.8	11	100
64	H8	0	0	0	0	0	0	100	100

Additional FT-IR images

(a) Before exposure to analyte



(b) After exposure to analyte

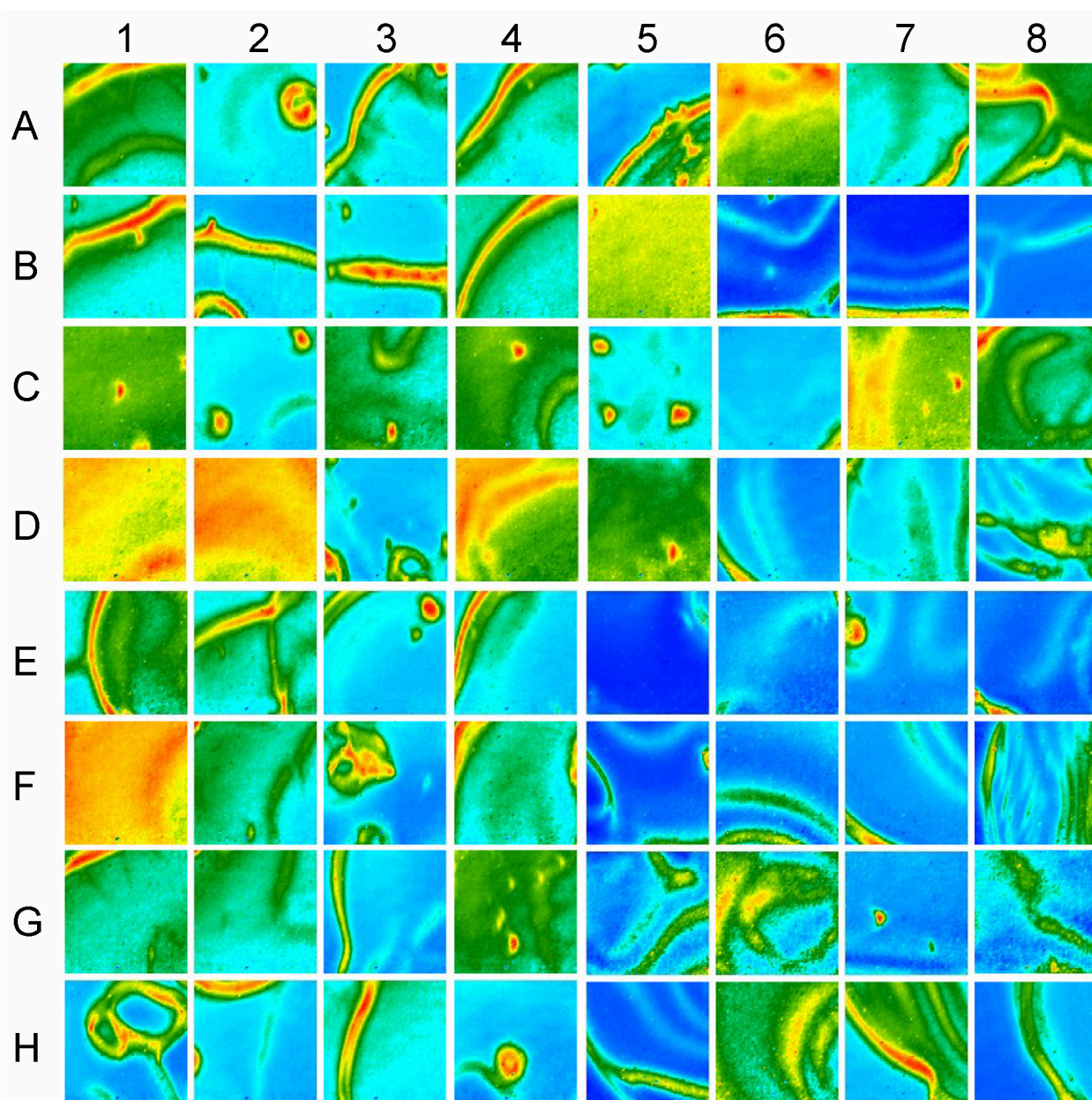
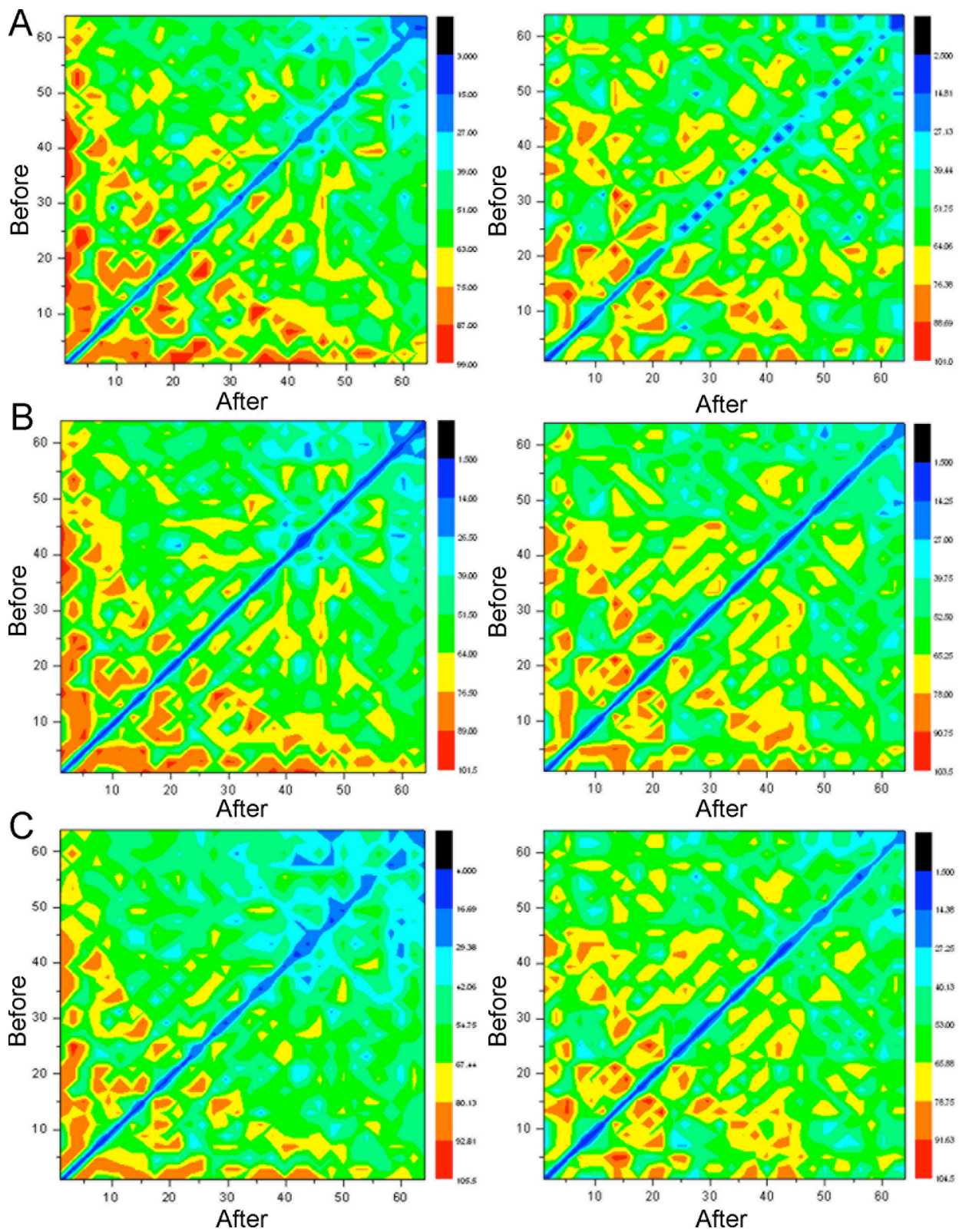


Figure S2 Additional FTIR images for the polymer sensors before (a) and after (b) hexane vapor treatment; the band was set at 3024 cm^{-1} (C-H stretching image). The dimension of each image is $352 \times 352\text{ }\mu\text{m}^2$.



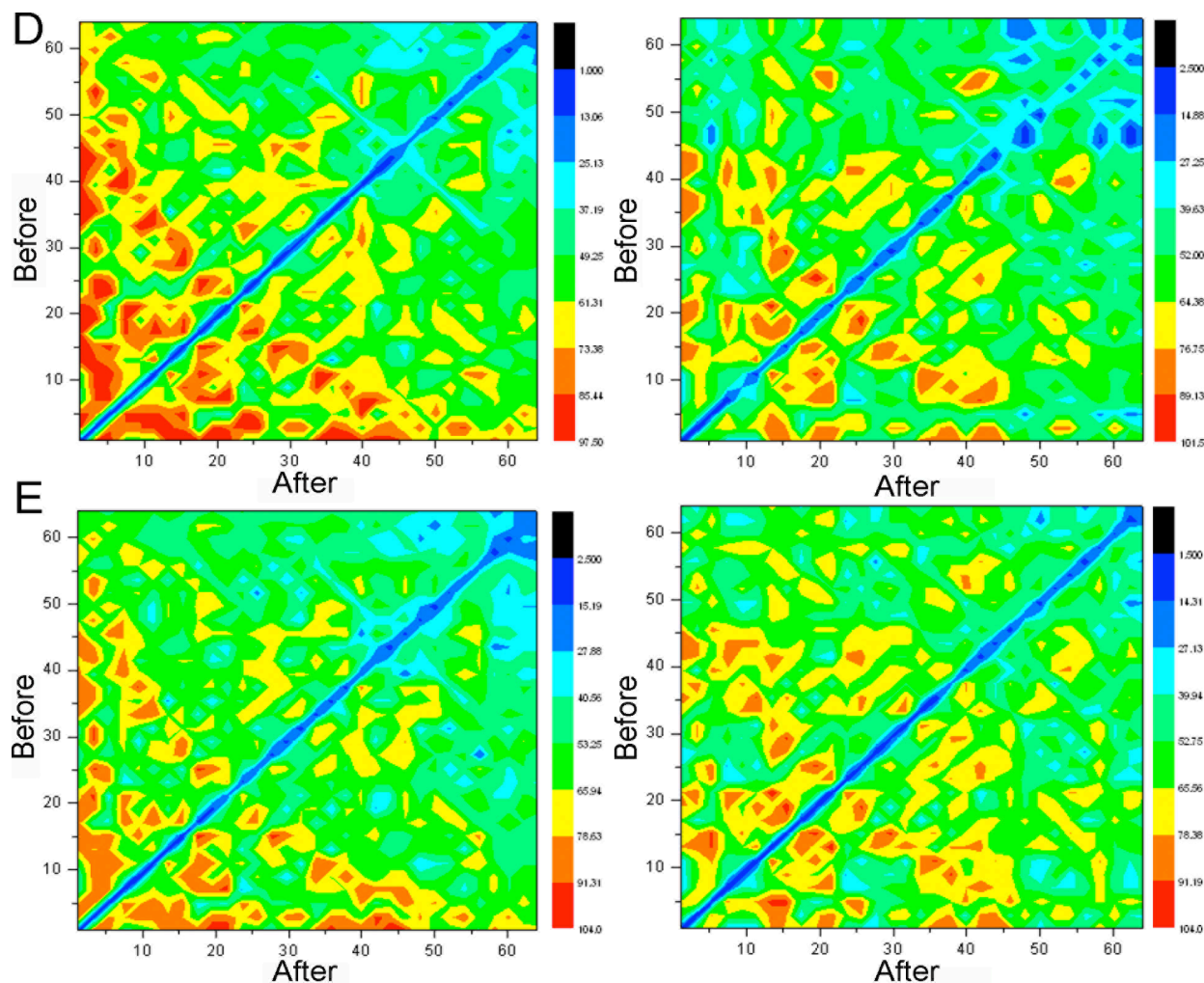


Figure S3. FTIR (left) and Raman (right) angle maps for the response (before versus after exposure to analyte vapor) of the polymer sensor arrays to various analytes (hexane (A); methylamine (B); acetonitrile (C); methanol (D); ethylacetate (E)). Theta maps can be used as an alternative way to characterize the vapors as θ values of a polymer change upon exposure to an analyte. Notably, comparison of identical polymers (theta values along the diagonal) is diagnostic of the sensor array's response to the analyte: a blue continuous diagonal suggests no effect whereas a discontinuous diagonal suggests an interaction of the analyte with specific elements of the sensor array.