Supporting Information

Vapor Phase Solvatochromic Response of Polydiacetylene Embedded Matrix Polymers

Meng-Che Tu, Jamal Ahmed Cheema, Umit Hakan Yildiz, Alagappan Palaniappan, Bo Liedberg*.*

List of Figures:

List of Tables:

Figure S1

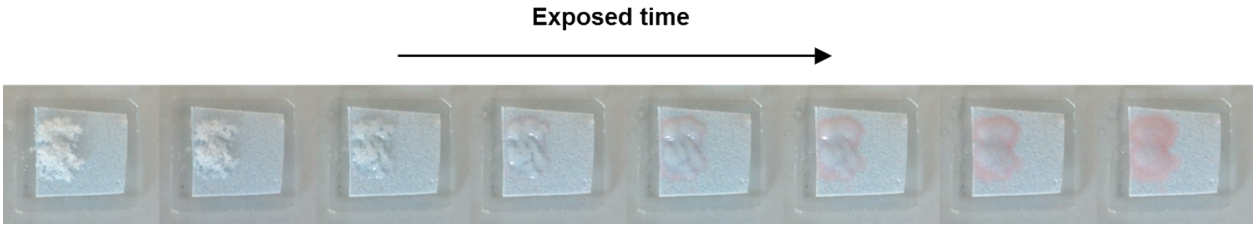

Figure S1. Solvatochromic response of PVP dispersed PDA upon ethanol exposure.

Figure S2

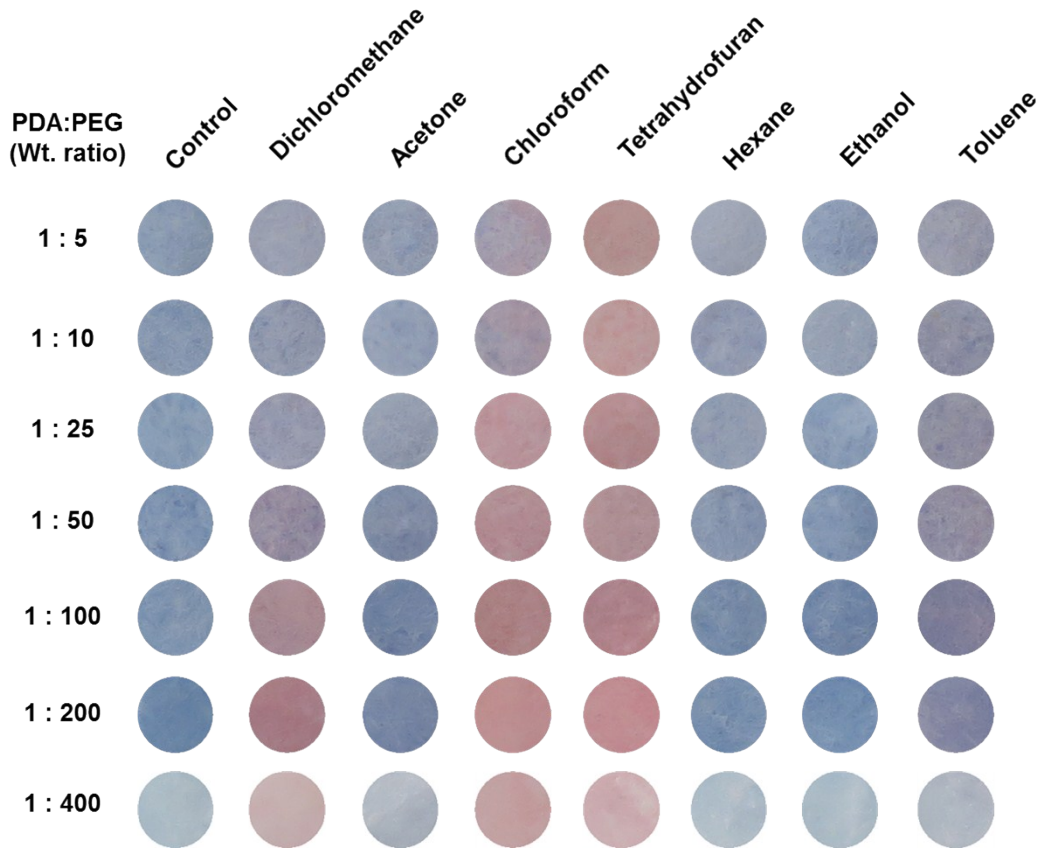

Figure S2. Optimization of the solvatochromic response of PDA-PEG membrane. PDA:PEG = 1:100 is evaluated as the optimized ratio. Concentraton of VOCs: 0.4% (v/v); Exposure time: 5 min.

Figure S3

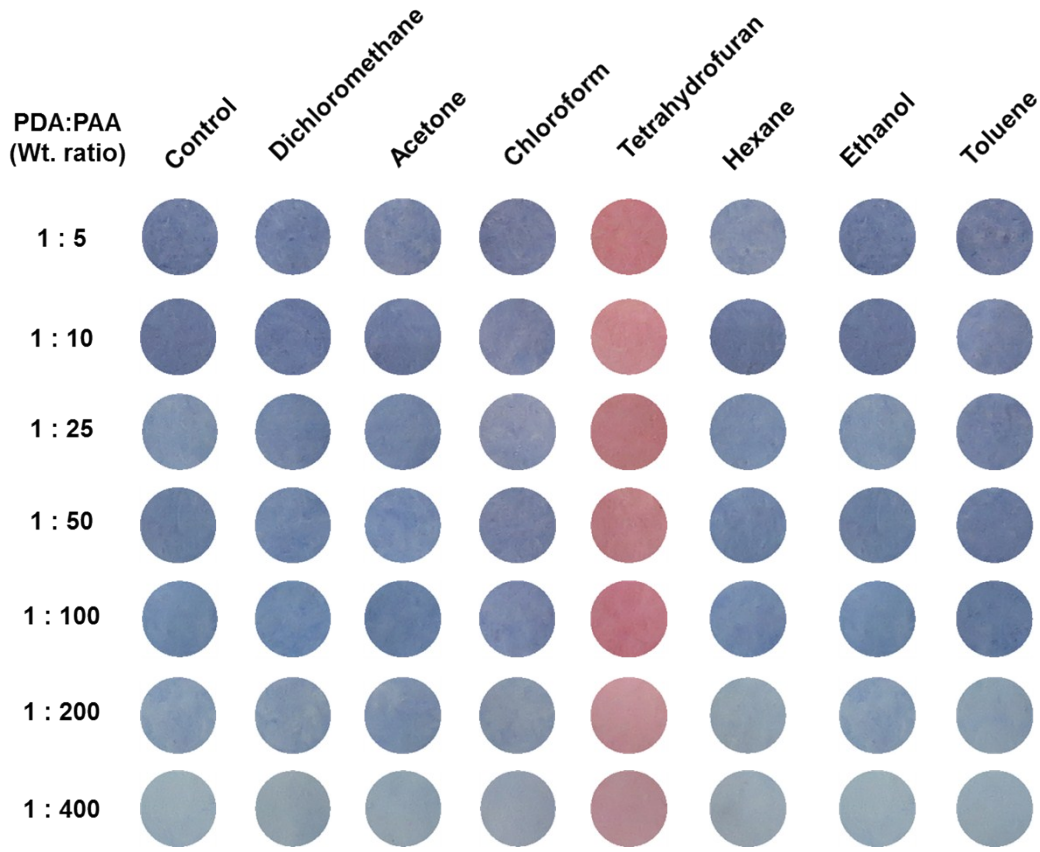

Figure S3. Optimization of the solvatochromic response of PDA-PAA membrane. PDA-PAA at all tested ratios does not yield or enhance solvatochromic response for VOCs. Concentraton of VOCs: 0.4% (v/v); Exposure time: 5 min.

Figure S4

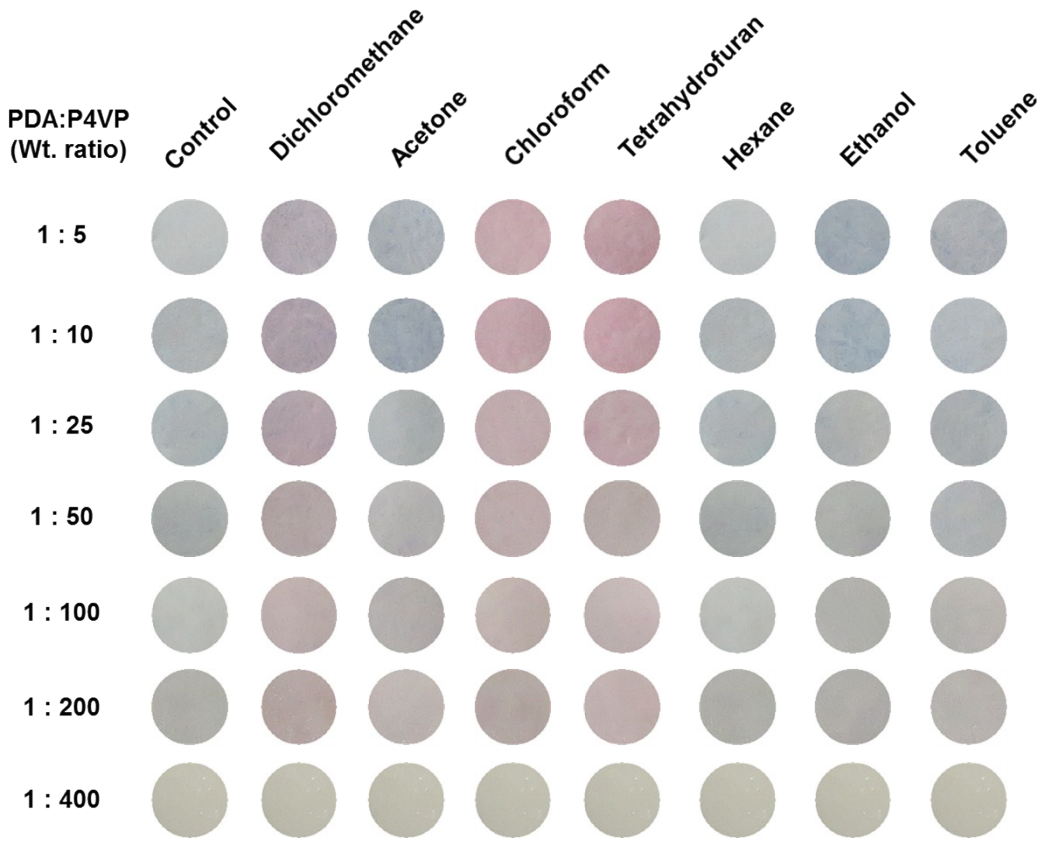

Figure S4. Optimization of the solvatochromic response of PDA-P4VP membrane. PDA:P4VP ratio of 1:10 yielded maximized solvatochromics. Increasing PDA:P4VP concentration ratio beyond 1:200 did not yield blue color upon UV polymerization. Concentraton of VOCs: 0.4% (v/v); Exposure time: 5 min.

Table S1

	Dichloromethane	Acetone	Chloroform	Tetrahydrofuran	Hexane	Ethanol	Toluene
PVP	19.3 %	4.7 %	52.2 %	4.2 %	4.4 %	7.4 %	4.9 %
PEG	29.2 %	2.4 %	98.7 %	3.4 %	6.8 %	0.5 %	7.0 %
PAA	3.7 %	5.2 %	0.4 %	6.2 %	2.6 %	2.3 %	3.4 %
P4VP	9.6 %	3.1 %	35.1 %	2.1%	2.5 %	2.3 %	4.4 %

Table S1. Weight increase % after 5 min exposure to 0.4 % v/v VOC. (10 ± 0.5 mg for each matrix polymer)

Table S2

Polymer or Solvent	**Hildebrand Solubility Parameter δ ($Mpa^{1/2}$)**
Polyvinylpyrrolidone (PVP)	22.3
Polyethylene glycol (PEG)	22.2
Polyacrylic acid (PAA)	25.7
Poly-4-vinylpyridine (P4VP)	- -
Dichloromethane	20.1
Acetone	20.3
Chloroform	19.0
Tetrahydrofuran	18.6
Hexane	14.9
Ethanol	26.0
Toluene	18.2

Table S2: Hildebrand solubility parameter of polymers and VOCs

Figure S5

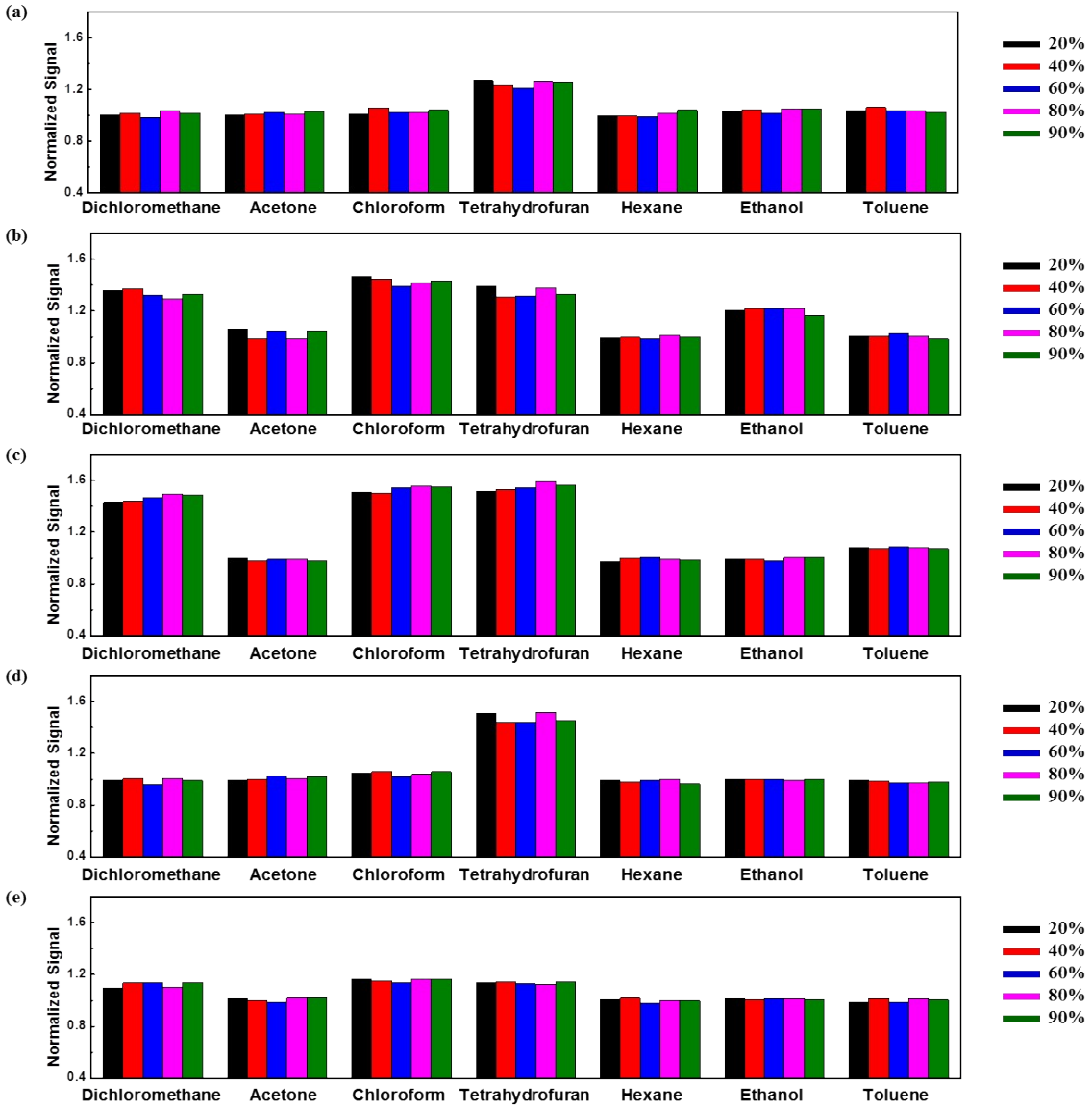

Figure S5. RGB analysis of (a) PDA, (b) PDA/PVP, (c) PDA/PEG, (d) PDA/PAA, and (e) PDA/P4VP at R.H. between 20% ~90%. Concentraton of VOCs: 0.4% (v/v); Exposure time: 5 min.