

Templated Polymers Enable Selective Capture and Release of Lysophosphatidic Acid in Human Plasma via Optimization of Non-Covalent Binding to Functional Monomers

Jialu Wang,[†] Martha Sibrian-Vazquez,[†] Jorge O. Escobedo,[†] Lei Wang,[†] Yu-Hsuan Chu,[†] Richard G. Moore^{*} and Robert M. Strongin^{†,*}

[†]Department of Chemistry, Portland State University, 1719 SW 10th Ave., Portland, Oregon 97201, United States

^{*}Women and Infants Hospital, Brown University, 101 Dudley Street, Providence, RI 02905, United States

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Job Plot Procedure.

Stock solutions of functional monomers and templates were the same as in the ^1H -NMR titration experiment. The concentration of the solution was 10 mM and the mole ratio of template and monomer were varied from 0/10 to 9/1. The chemical shifts (δ) of the proton of the urea group and the adjacent methylene group were monitored. A titration of MAA and OPA was performed using the same protocol.

Table S1. Data for the Job plot performed by ^1H NMR titration in CDCl_3 .

Mixture No.	Monomer 1 (mM)	Template (mM)	Mole fraction (monomer 1)	δ (ppm)	$\Delta\delta$ (ppm)	$\Delta\delta \times \text{Mole fraction}$
1	10	0	1	3.1683	0	0
2	9	1	0.9	3.1901	2.1683	0.0196
3	8	2	0.8	3.2291	2.1901	0.0486
4	7	3	0.7	3.2784	2.2291	0.077
5	6	4	0.6	3.3346	2.2784	0.0998
6	5	5	0.5	3.4273	2.3346	0.1295
7	4	6	0.4	3.4633	2.4273	0.118
8	3	7	0.3	3.5123	2.4633	0.1032
9	2	8	0.2	3.5538	2.5123	0.0771
10	1	9	0.1	3.5563	2.5538	0.0388
11	0	10	0	-	-	-

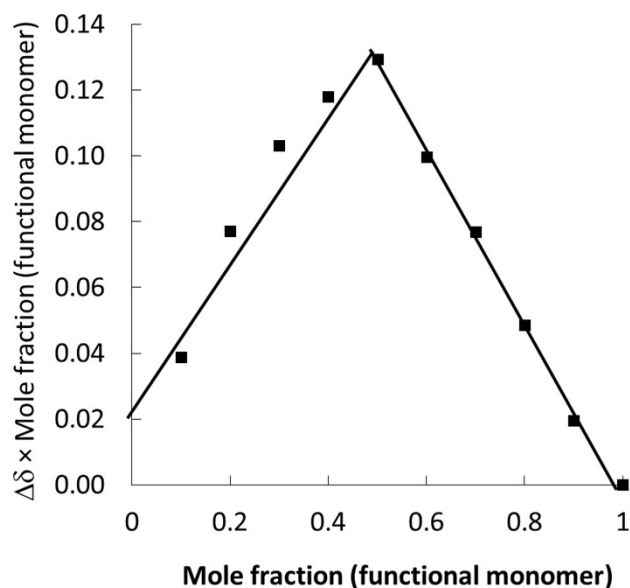


Figure S1. Job plot of monomer 1 with OPA.

Table S2. Data of ^1H NMR titration of monomer **1** with template in CDCl_3 .

Mixture No.	Monomer 1 (mM)	Template (mM)	$\Delta\delta_1$ (ppm) H_a and H_a'	$\Delta\delta_2$ (ppm) H_b	$\Delta\delta_3$ (ppm) H_c
1	5	0	0	0	0
2	5	0.5	0.12	0.02	0.06
3	5	1	0.19	0.04	0.1
4	5	1.5	0.26	0.07	0.16
5	5	2	0.33	0.09	0.2
6	5	3	0.46	0.13	0.29
7	5	4	0.6	0.17	0.38
8	5	5	0.64	0.21	0.47
9	5	7.5	0.66	0.29	0.64
10	5	10	-	0.33	0.74
11	5	15	-	0.37	0.84
			$Ka = 86.6 \text{ M}^{-1}$	$Ka = 82.4 \text{ M}^{-1}$	$Ka = 80.6 \text{ M}^{-1}$

Table S3. Swelling factor and density of non-imprinted and imprinted polymers.

	Non-imprinted polymer	Imprinted polymer
Density	0.331 g/mL	0.647 g/mL
Swelling factor	2.05	3.47

Table S4. Statistical values from calibration curves for LPA subspecies using LC-ESI/MS as the quantification method.

LPA species	Retention time (min)	Equation	R^2	LOD (μM)
14:0	3.78	$y = 0.0804x + 0.0164$	0.9958	0.126
20:4	4.41	$y = 0.0939x + 0.0219$	0.9941	0.153
16:0	4.87	$y = 0.0821x + 0.0156$	0.9972	0.166
18:1	5.32	$y = 0.0775x + 0.0156$	0.9954	0.182
18:0	6.60	$y = 0.0734x + 0.0114$	0.9967	0.225

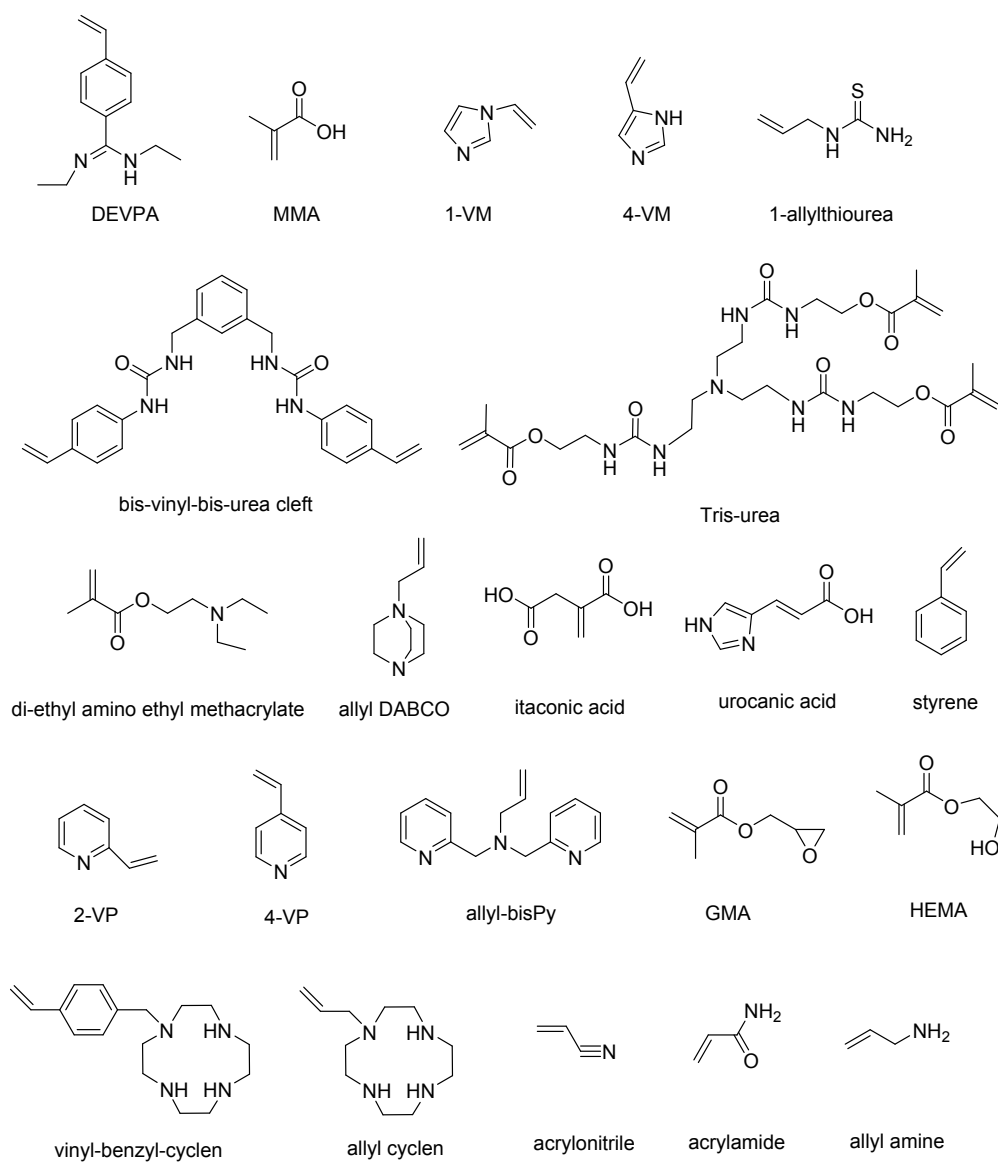


Figure S2. Functional monomers used for the virtual library.

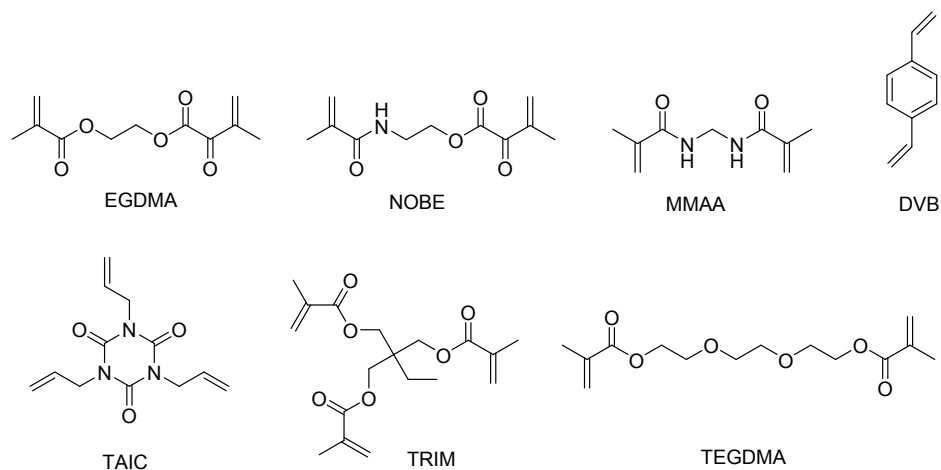


Figure S3. Cross-linking monomers used for virtual library.

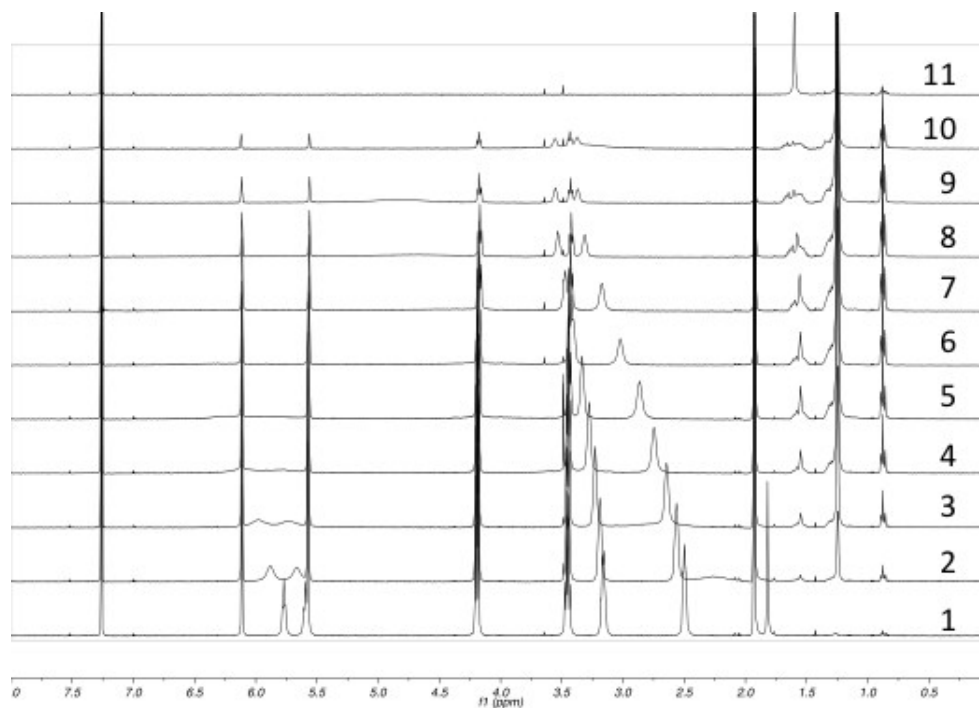


Figure S4. ^1H NMR spectra of Job plot data for trisurea and octadecylphosphonic acid. Each spectrum is labeled with the mixture numbers in Table S1.

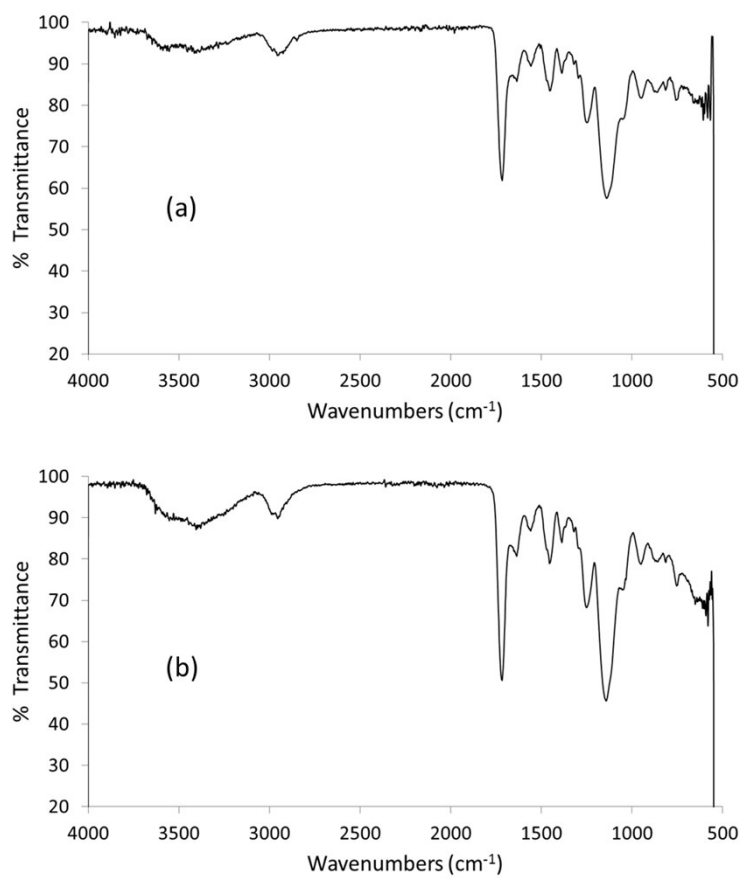
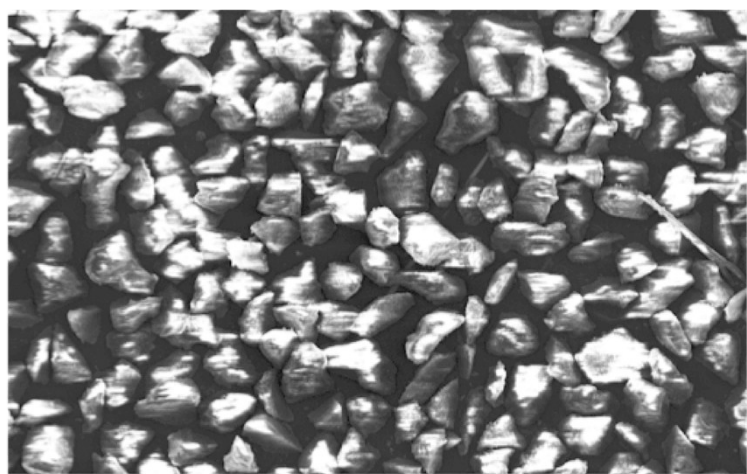


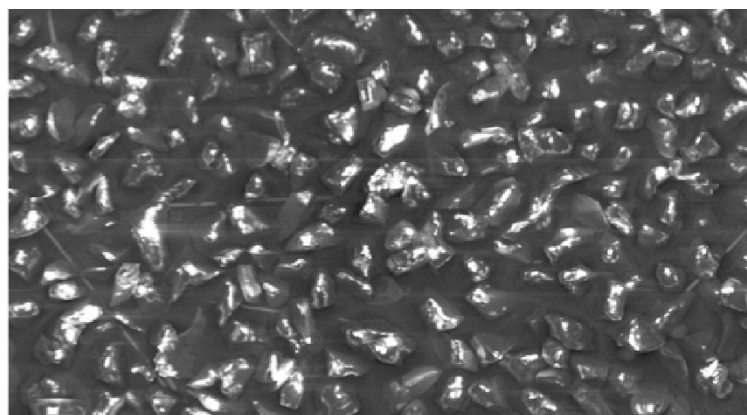
Figure S5. IR spectra of (a) non-imprinted polymer and (b) imprinted polymer after template removal.



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100 μ m

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Signal B=InLens EHT=15.00kV Date:10 Dec 2014
Mix Signal=0.0000 Photo No.=16536 Sample ID=1

(a)



Mag=179X
100 μ m

Center for Electron Microscopy
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Signal B=InLens EHT=15.00kV Date:10 Dec 2014
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(b)

Figure S6. SEM microphotographs of non-imprinted (a) and imprinted (b) polymers.

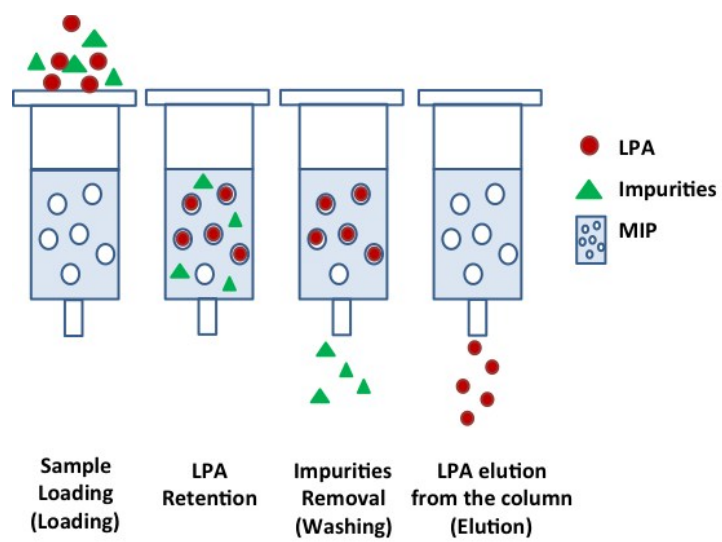


Figure S7. Scheme of SPE protocols using MIP.

(1) Wu, X.; Goswami, K.; Shimizu, K. D. *J. Mol. Recognit.* **2008**, *21*, 410.