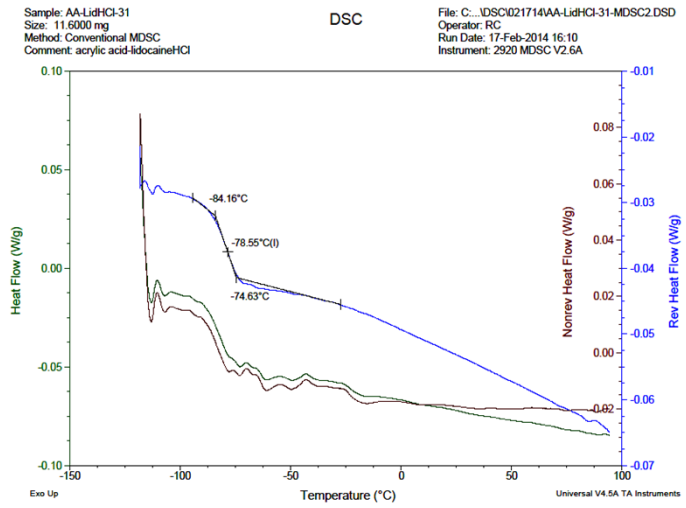
Electronic Supplementary Information

Controlled release of lidocaine hydrochloride from polymerized drug-based deep-eutectic solvents

Regina J. Sánchez-Leija, John A. Pojman, Gabriel Luna-Bárcenas, Josué D. Mota-Morales**

FIGURE S1. DSC of the drug-based deep-eutectic solvents.



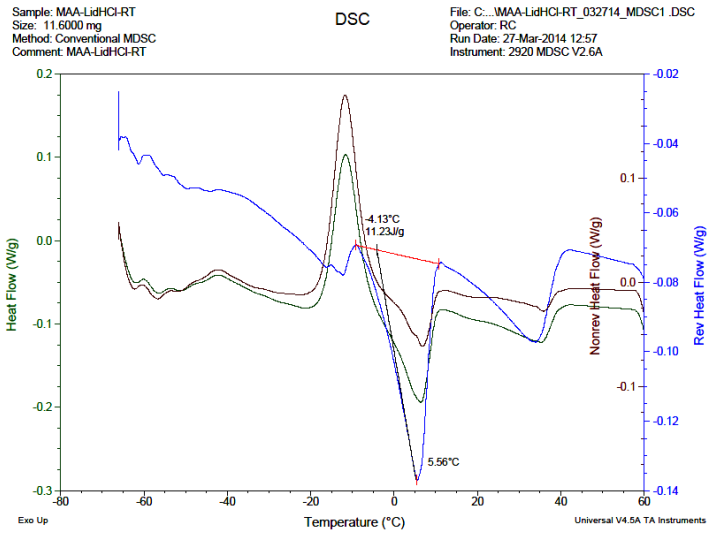
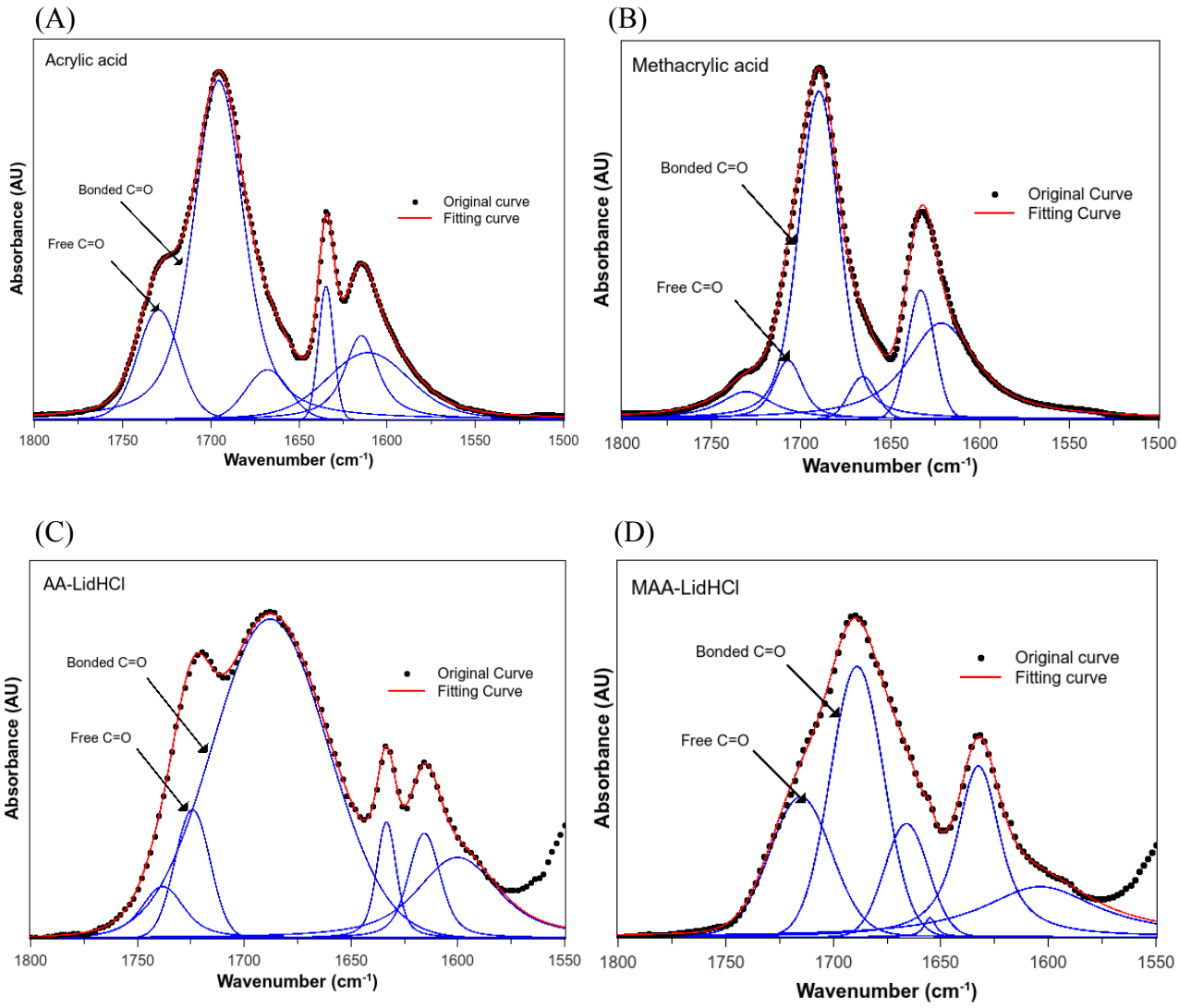


FIGURE S2. Analysis of carbonyl in acrylic acid (A), methacrylic acid (B), and AALidHCl (C) and MAALidHCl (D) DES.



Bonded carbonyl fraction calculated for monomers and DESs from FTIR analysis.

	Peak wavenumber (cm^{-1})	Peak area	$X_{C=O\ bonded}$
AA	1695	3122.94	0.78
	1730	712.14	
AA-LidHCl	1688	2863.30	0.87
	1724	350.40	
MAA	1690	2243.43	0.86
	1731	313.35	
MAA-LidHCl	1689	1336.33	0.57
	1715	838.41	

The bonded carbonyl fraction for monomers and eutectic mixtures was calculated using the following expression [1]:

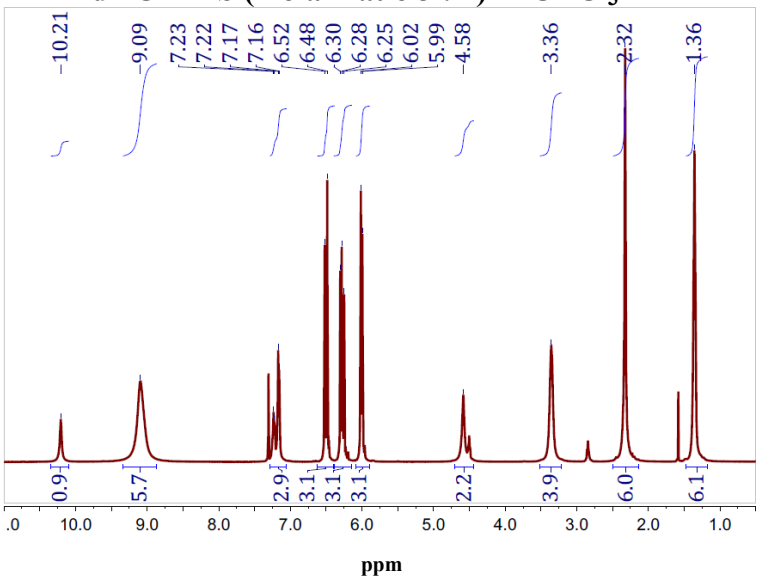
$$X_{bonded\ C=O} = \frac{1}{1 + 1.2\left(\frac{A_{free\ C=O}}{A_{bonded\ C=O}}\right)}$$

*A Voigt model was used to fit the spectra.

[1] H. Zhou, Q. Li, T. Y. Lee, C. Guymon, E. Sonny Jönsson, C. E. Hoyle, Macromol. 2006, 39, 8269-8273

FIGURE S3. ^{1}H NMR of AA-LidHCl and MAA-LidHCl DESs.

AA-LidHCl DES (molar ratio 3 : 1) in $CDCl_3$



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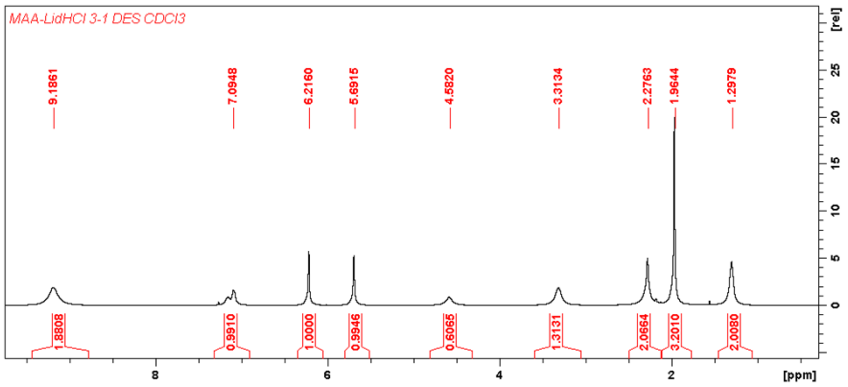
SAMPLE	δ(ppm)										
	AA				LidHCl·H_2O						
	H – C – H = C – H – COOH				$(CH_3)_2$ C_6H_3 – NHCO – CH_2 – NH^+ – (CH_2 – CH_3)$_2$						
LidHCl**					2.12	7.19	9.15	3.22	7.0	3.37	1.56
AA*	6.52	5.96	6.14	12.0							
AA-LidHCl 3 : 1	6.50	6.10	6.29		2.32	7.20	10.2	4.58	9.09	3.36	1.36

MAA-LidHCl DES (molar ratio 3 : 1) in $CDCl_3$



SAMPLE	δ(ppm)										
	MAA				LidHCl·H_2O						
	H – C – H = C – CH_3 – COOH				$(CH_3)_2$ C_6H_3 – NHCO – CH_2 – NH^+ – $(CH_2 – CH_3)_2$						
LidHCl**					2.12	7.19	9.15	3.22	7.0	3.37	1.56
MAA*	6.26	5.68	1.96	11.3							
MAA-LidHCl 3 : 1	6.21	5.69	1.96		1.29	7.09	10.5	4.58	9.18	3.31	1.29

*Data from SDBSWeb : http://riodb01.ibase.aist.go.jp/sdbs/ (National Institute of Advanced Industrial Science and Technology, 08.15.2014)
**Data from *ChemDraw*™ ^1H NMR estimation.

FIGURE S4. Photograph of the polymer-drug monoliths.

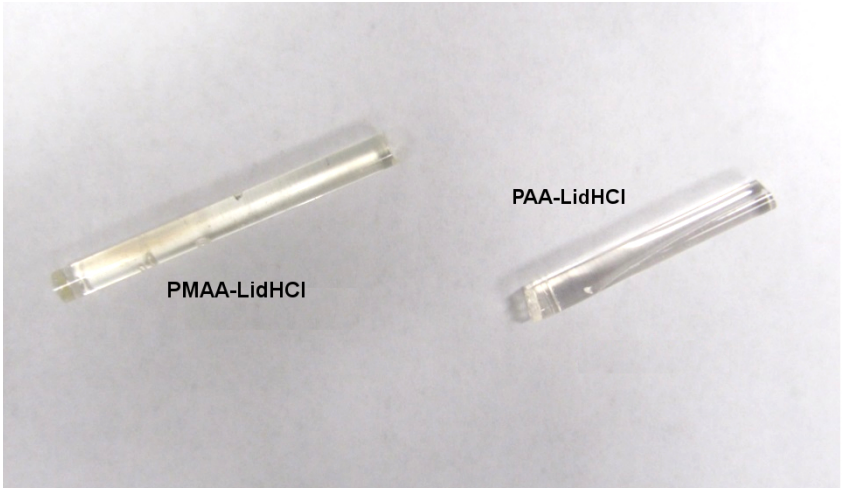


FIGURE S5. Thermogravimetric analysis of the polyacrylates-lidocaine hydrochloride and lidocaine hydrochloride monohydrate.

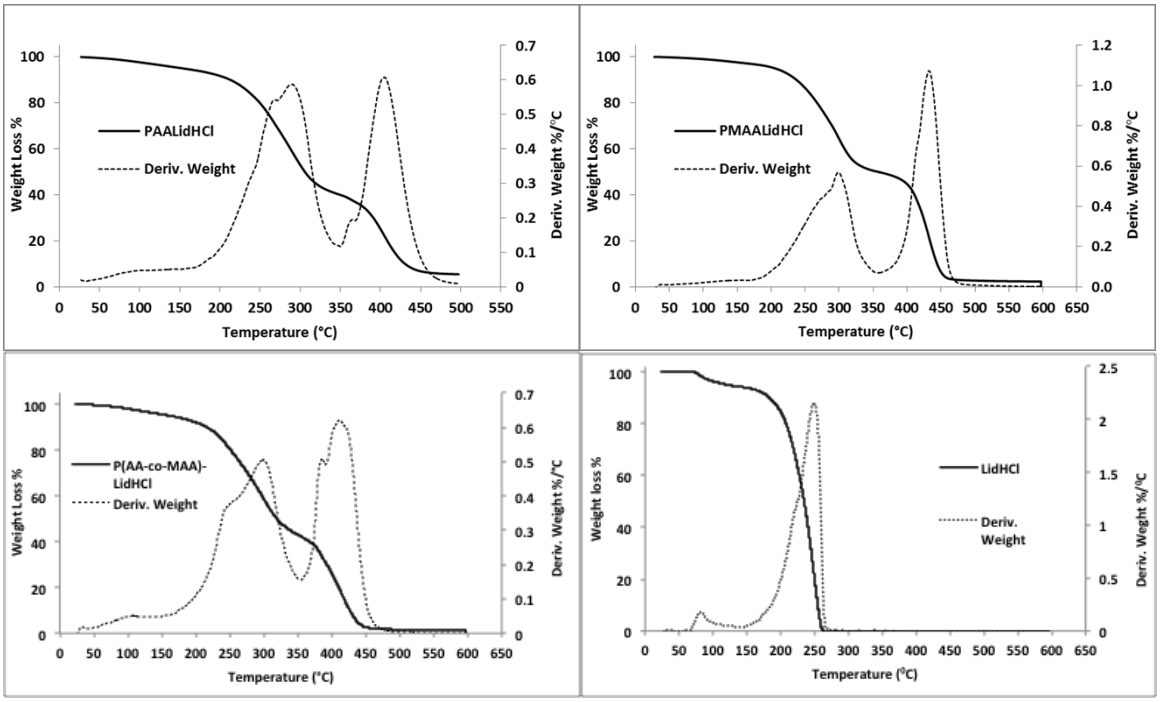
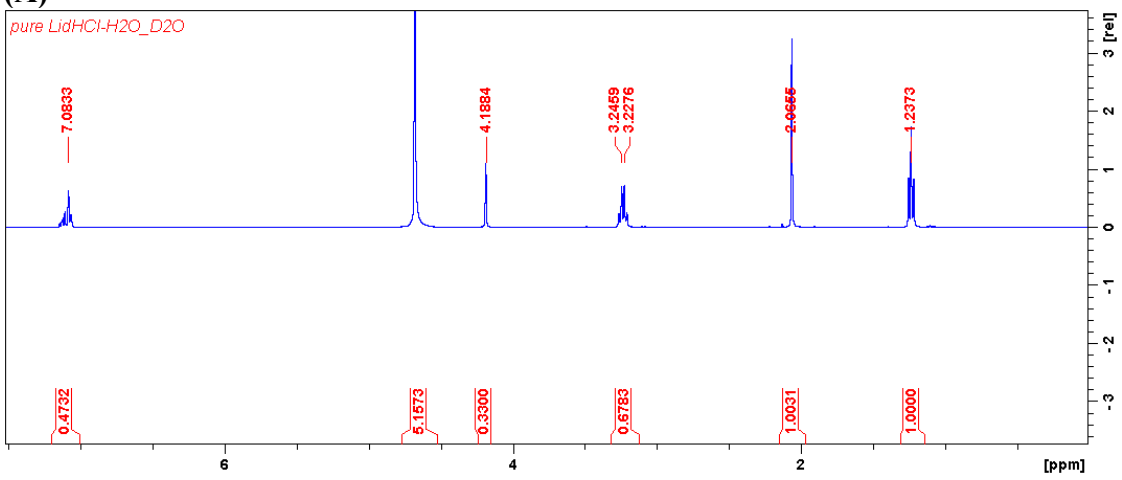
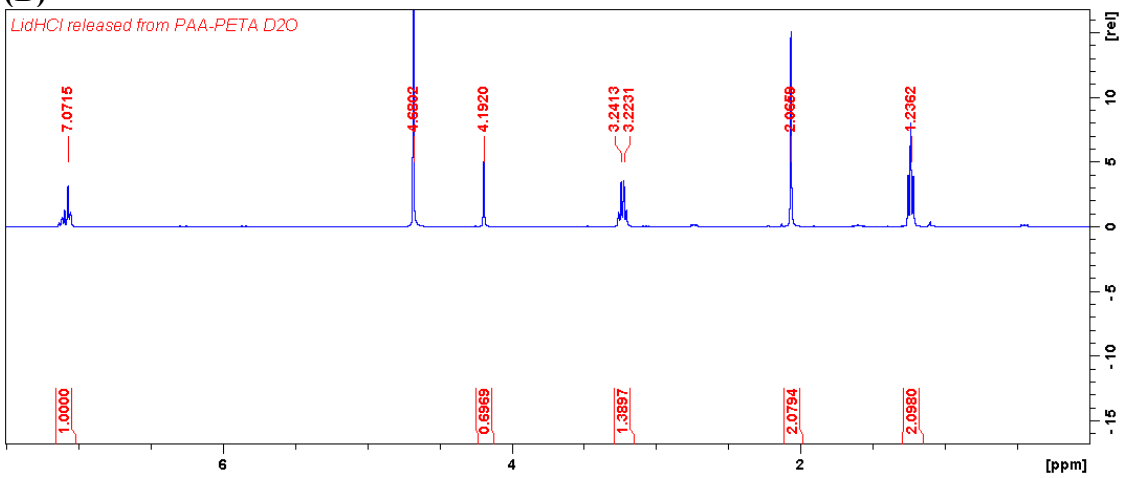


FIGURE S6. ^{1}H NMR of pure lidocaine hydrochloride monohydrate (A), lidocaine hydrochloride released in D_2O from PAA-LidHCl (B) and PMAA-LidHCl (C) and P(AA-co-MAA)-LidHCl.

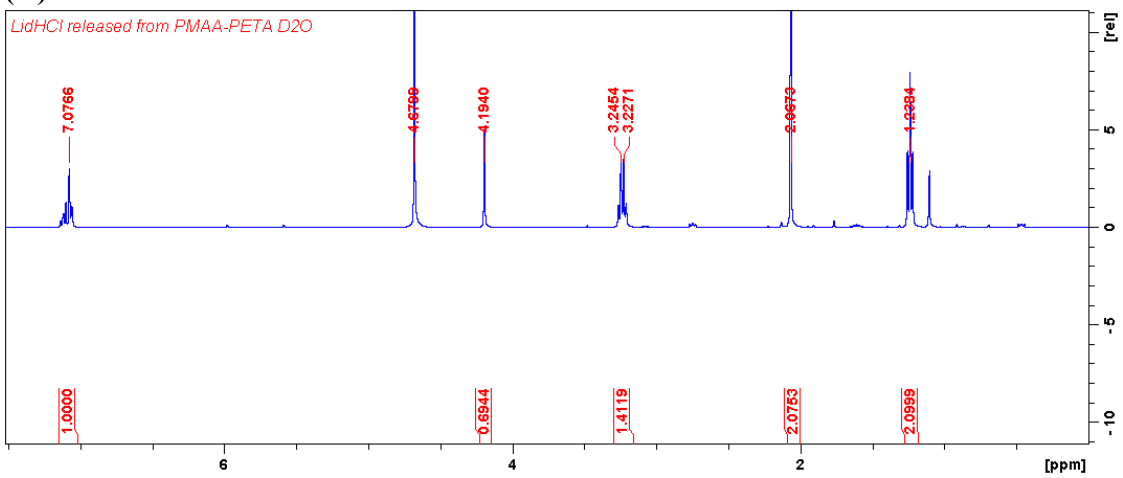
(A)



(B)


LidHCl released from PAA-PETA D2O
7.0715
4.6802
4.1920
3.2413
3.2231
2.0658
1.2362
1.0000
0.6969
1.3897
2.0794
2.0980
[rel]
[ppm]

(C)


LidHCl released from PMAA-PETA D2O
7.0766
4.6790
4.1940
3.2454
3.2271
2.0673
1.2384
1.0000
0.6944
1.4119
2.0753
2.0959
[rel]
[ppm]

(D)

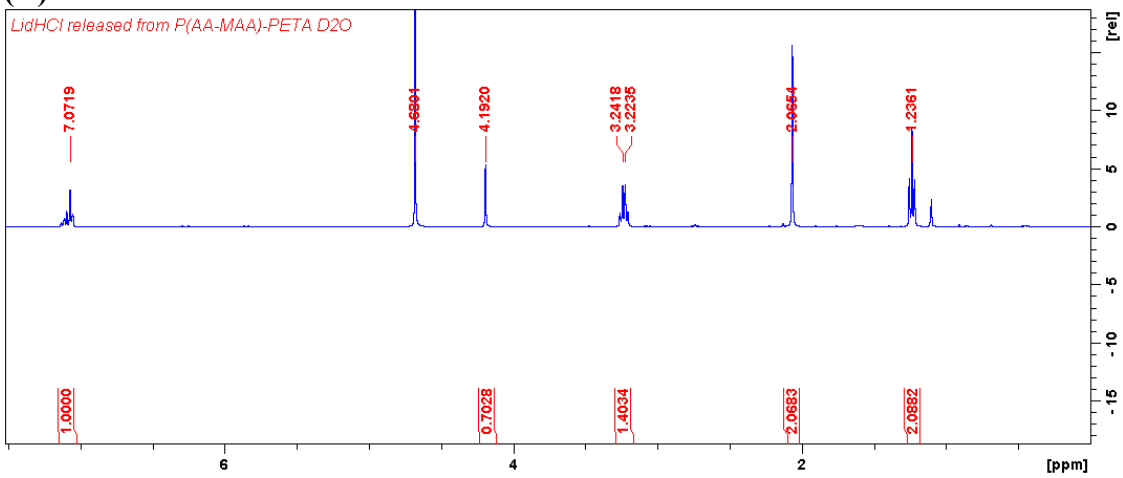

LidHCl released from P(AA-MAA)-PETA D2O
7.0719
4.6801
4.1920
3.2418
3.2235
2.0654
1.2361
1.0000
0.7028
1.4034
2.0683
2.0882
[rel]
[ppm]

FIGURE S7. % Cumulative release of LidHCl versus the square root of time and linear fitting to Fickian model with n=0.5.

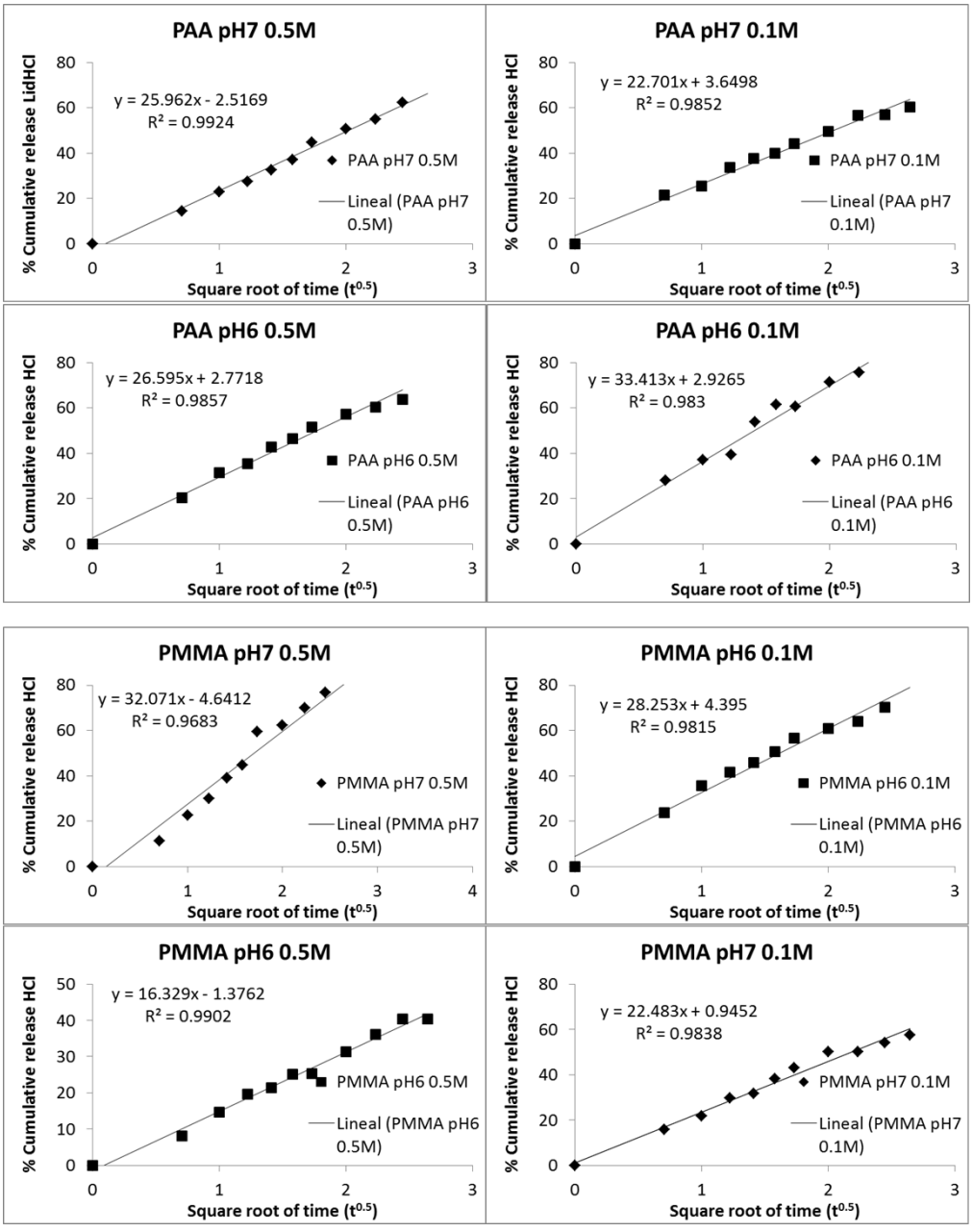


FIGURE S8. Diameter of PAA-LidHCl cylinders at pH 6 (A) and pH 7 (B) versus the square root of time and linear fitting to Fickian model with n=0.5.

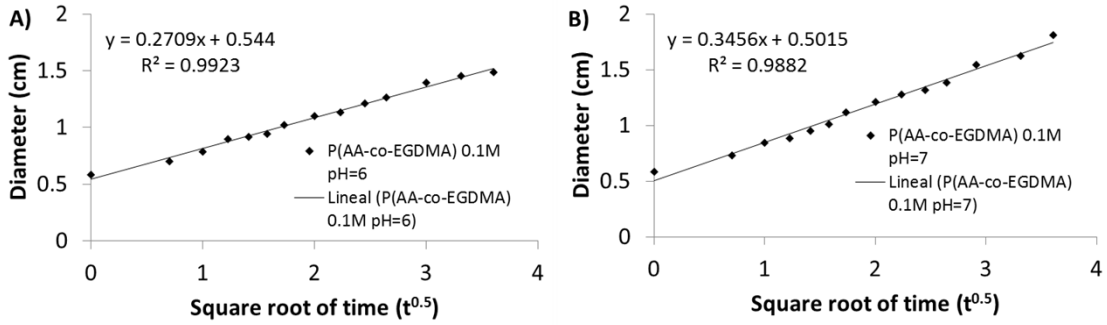


FIGURE S9. Experimental setup for frontal polymerization.

FIGURE S10. Calibration curve for the quantification of LidHCl by UV-Vis spectroscopy at 263 nm.