

Synthesis of glycidyl azide polymers (GAPs) via binary ionic liquid–water mixtures without catalysts

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Supporting Information

General Methods: The GAP synthesis was carried out in a 250 ml three-necked round bottom flask equipped with a thermometer, a reflux condenser, and a mechanical stirrer. The 30.00 g of PECH was dissolved in mixed solvents with a different mass ratio of [Bmim]Cl and distilled water and stirred. The solution was heated to 95 °C in an oil bath, and then 21.09 g of sodium azide was rapidly added into the reaction mixture with continued stirring for 10 h at this temperature. The reaction was monitored with quantitative ¹³C-NMR. After the reaction finished, the mixtures were washed sequentially with distilled water more than 3 times until all salts were removed. The water was then evaporated to recover the products.

Table 1.

Entry	[bmim][Cl]/ H ₂ O ^a	PECH g	NaN ₃ g	Time h	T °C	Yield ^b %
1	4:1	30	21.09	10	95	89.17
2	5:1	30	21.09	10	95	56.52
3	100:0	30	21.09	10	95	50
4	1:1	30	21.09	10	95	45.7
5	2:3	30	21.09	10	95	37.5
6	1:4	30	21.09	10	95	24.82
7	0:100	30	21.09	10	95	0

^a mass ratio

^b Isolated yields

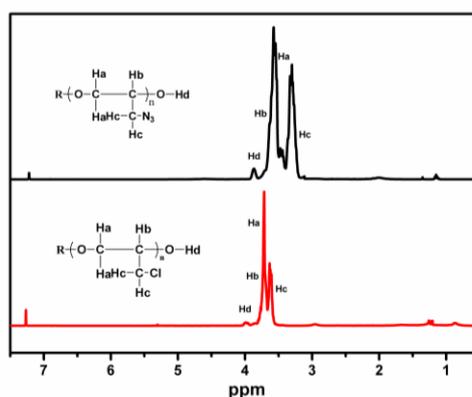


Fig.1. ¹H-NMR spectra of GAP¹ and PECH.

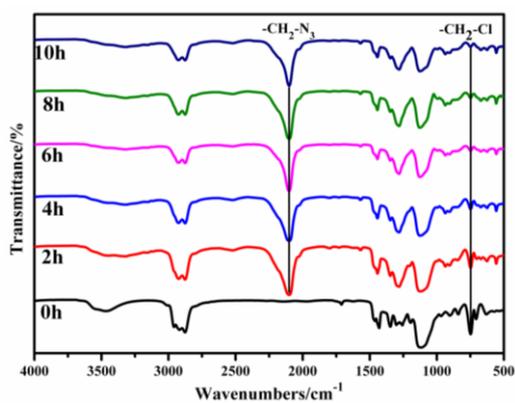


Fig.2. IR spectra of GAP1.

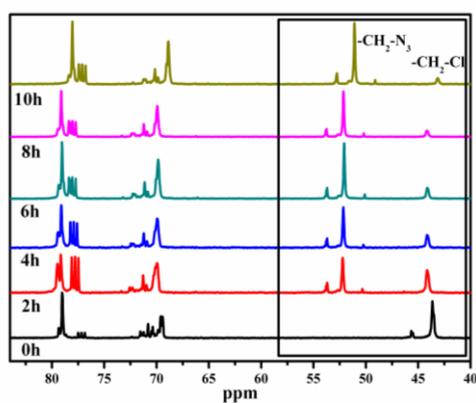


Fig.3. ¹³C-NMR spectra of GAP1.

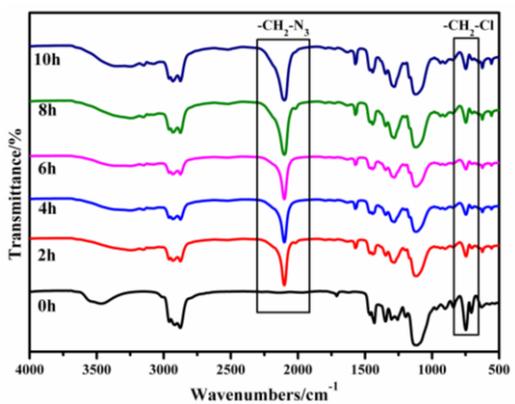


Fig.4. IR spectra of GAP2.

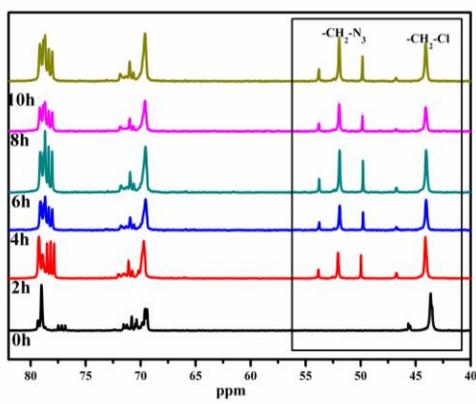


Fig.5. ¹³C-NMR spectra of GAP2.

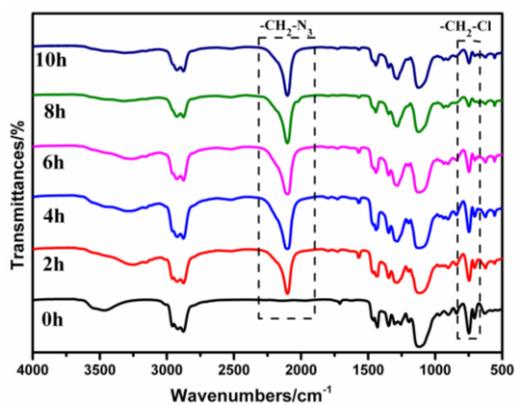


Fig.6. IR spectra of GAP3.

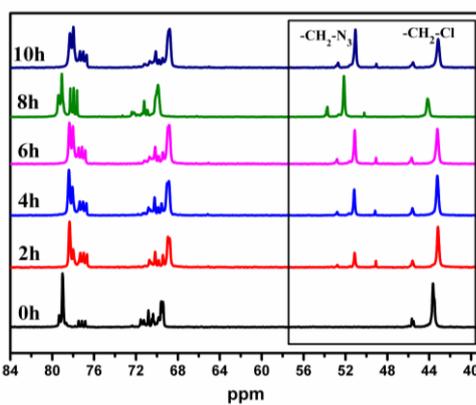


Fig.7. ¹³C-NMR spectra of GAP3.

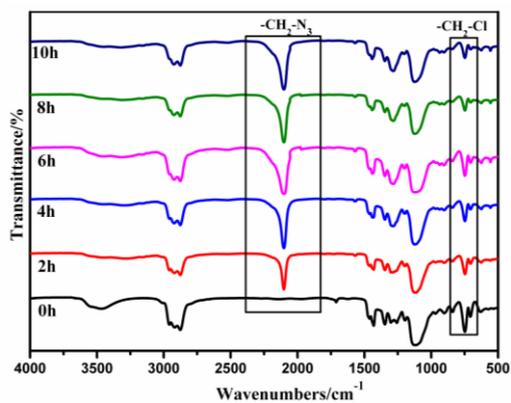


Fig.8. IR spectra of GAP4.

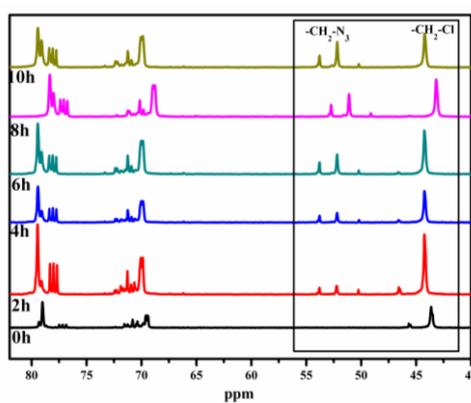


Fig.9. ¹³C-NMR spectra of GAP4.

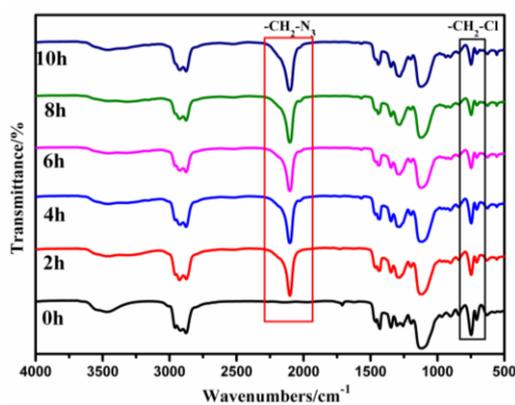


Fig.10. IR spectra of GAP5.

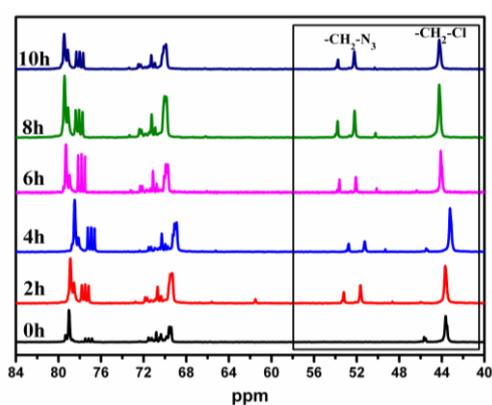


Fig.11. ¹³C-NMR spectra of GAP5.

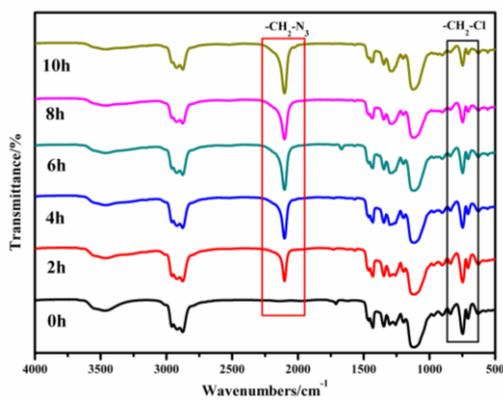


Fig.12. IR spectra of GAP6.

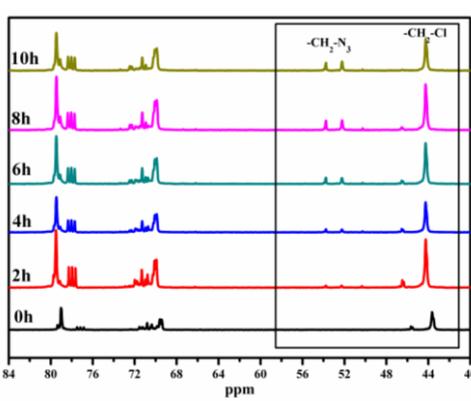


Fig.13. ¹³C-NMR spectra of GAP6.

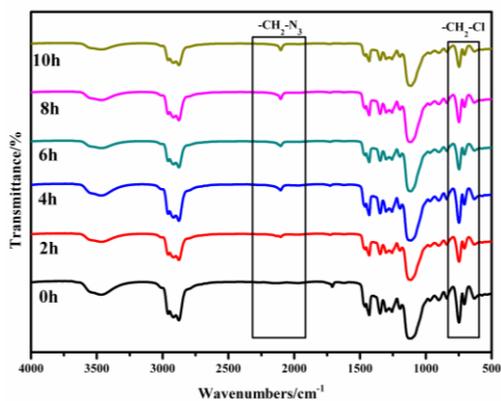


Fig.14. IR spectra of GAP7.

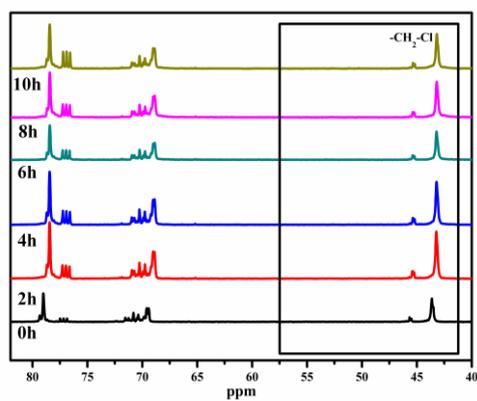


Fig.15. ^{13}C -NMR spectra of GAP7.

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[3] B. G. Kim, E. H. Sohn, J. S. Chung, S. Y. Kwak and J. C. Lee, *J Appl Polym Sci*, 2009, **114**, 132.