Electronic Supplementary Material (ESI) for Polymer Chemistry.

Electronic Supplementary Information

Antibacterial activities of N-alkyl imidazolium-based poly(ionic liquid) nanoparticles

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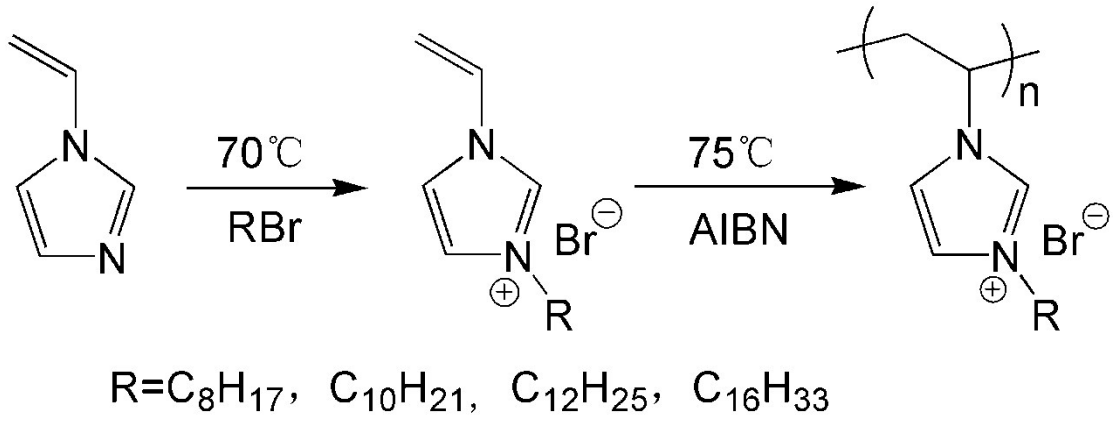

Fig. S1. General synthetic route of poly[C_nVIm$^+$][Br$^-$] (n =8, 10, 12 and 16)

Table S1 Yields and molecular weights of poly[C_nVIm$^+$][Br$^-$] (n =8, 10, 12 and 16)

Samples	Yield	Molecular weight	
		Mn	PDI
poly[C_8VIm$^+$][Br$^-$]	78%	16855	1.52
poly[C_{10}VIm$^+$][Br$^-$]	81%	16231	1.73
poly[C_{12}VIm$^+$][Br$^-$]	80%	12379	1.72
poly[C_{16}VIm$^+$][Br$^-$]	76%	10841	1.58

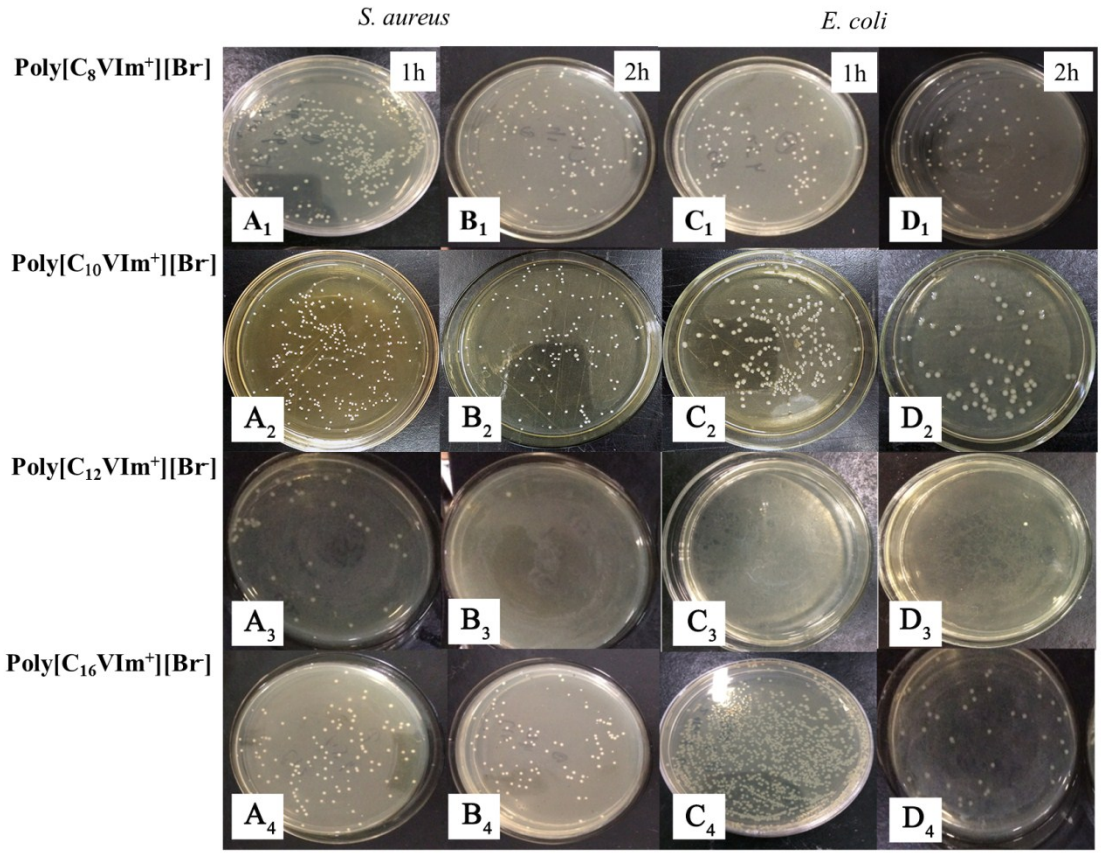

Fig. S2. Number of colony forming units (CFU) of *E. coli* and *S. aureus*treated with PIL nanoparticlesat different contacting hours. (A_1-D_1) poly[C_8VIm^+][Br^-]; (A_2-D_2) poly[$C_{10}VIm^+$][Br^-]; (A_3-D_3) poly[$C_{12}VIm^+$][Br^-]; (A_4-D_4) poly[$C_{16}VIm^+$][Br^-].

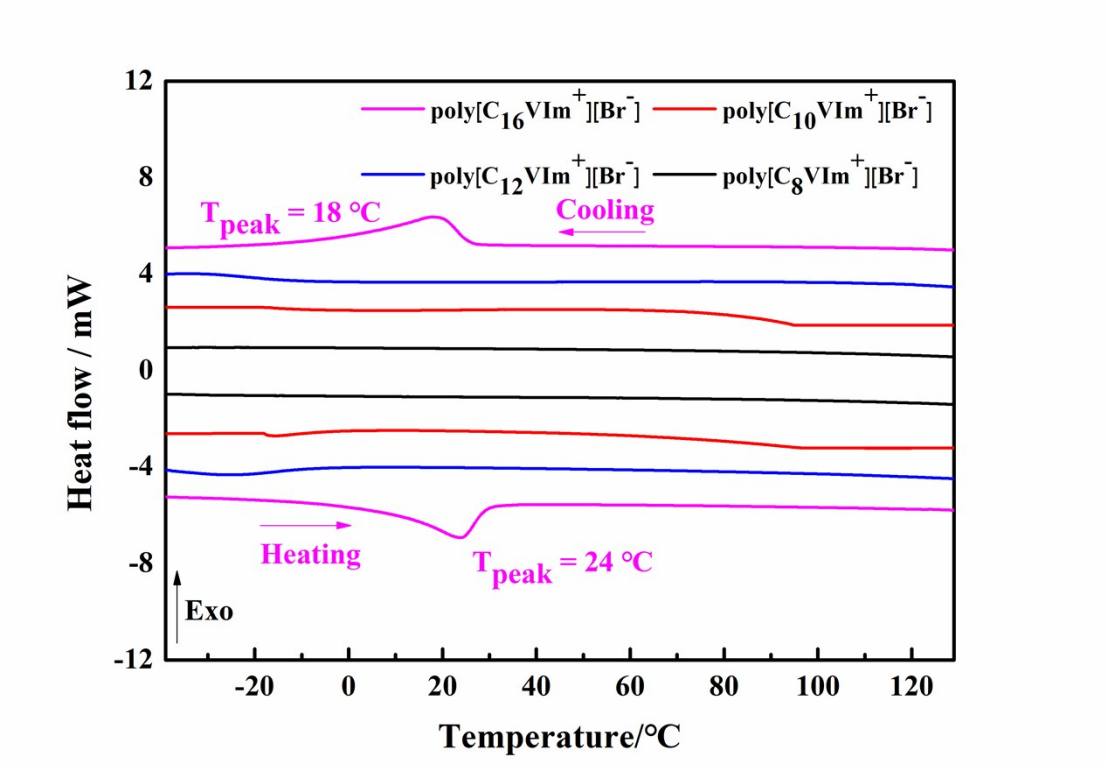

Fig. S3. Differential scanning calorimetry (DSC) curves of poly[C_nVIm$^+$][Br$^-$] (n =8, 10, 12 and 16)

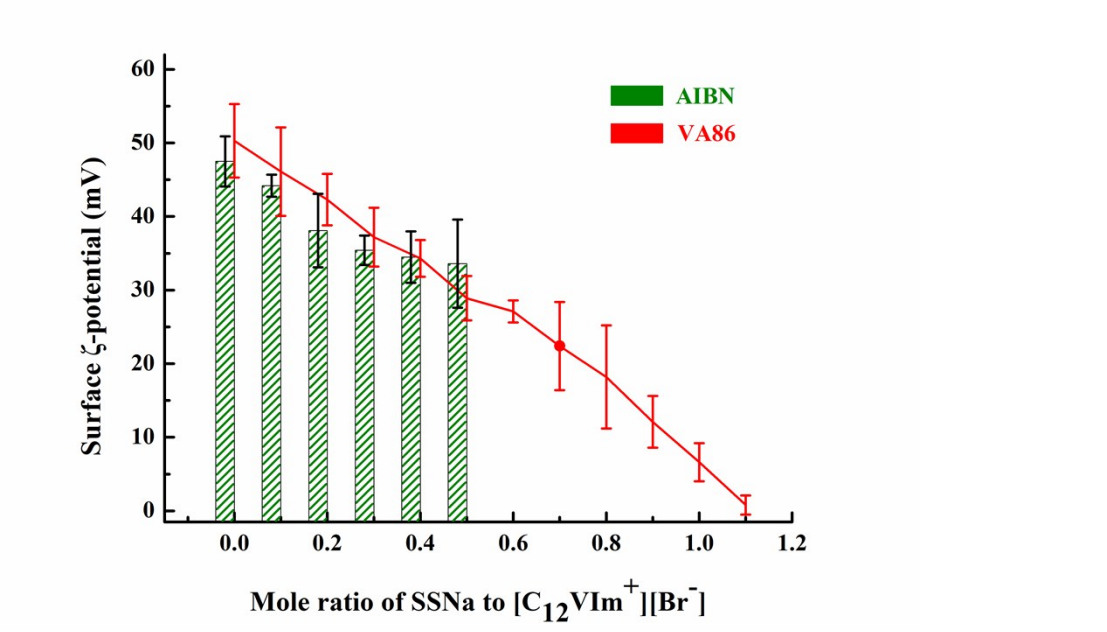

Fig. S4. Surface ζ-potential of poly[C_{12}VIm$^+$][Br$^-$]-r-PSSNa with different SSNa content prepared by using AIBN and VA86 as initiator.

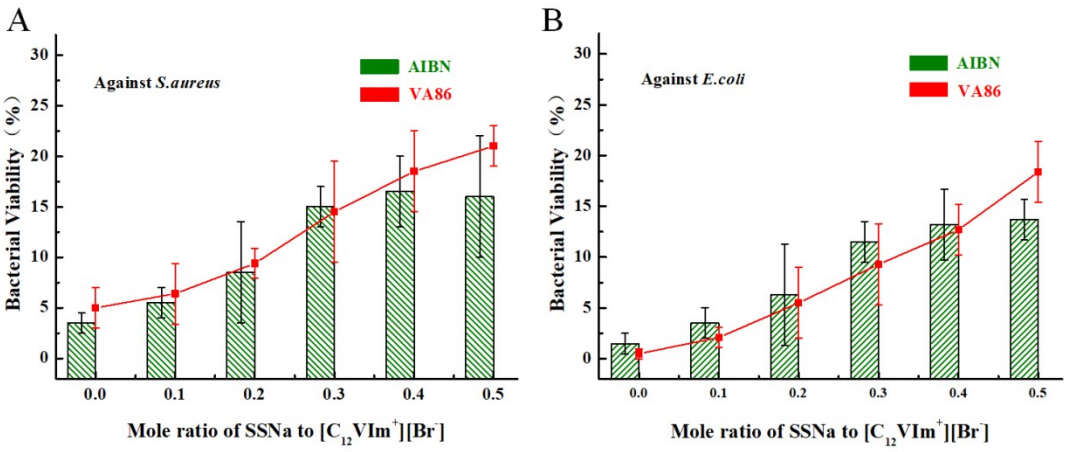

Fig. S5. Bacterial viabilities of (A) *S. aureus* and (B) *E. coli* after contacting with poly[$C_{12}VIm^+$][Br^-]-r-PSSNa for 1 h; The random copolymers were synthesized by using AIBN (green column) and VA86 (red line) as initiator respectively.

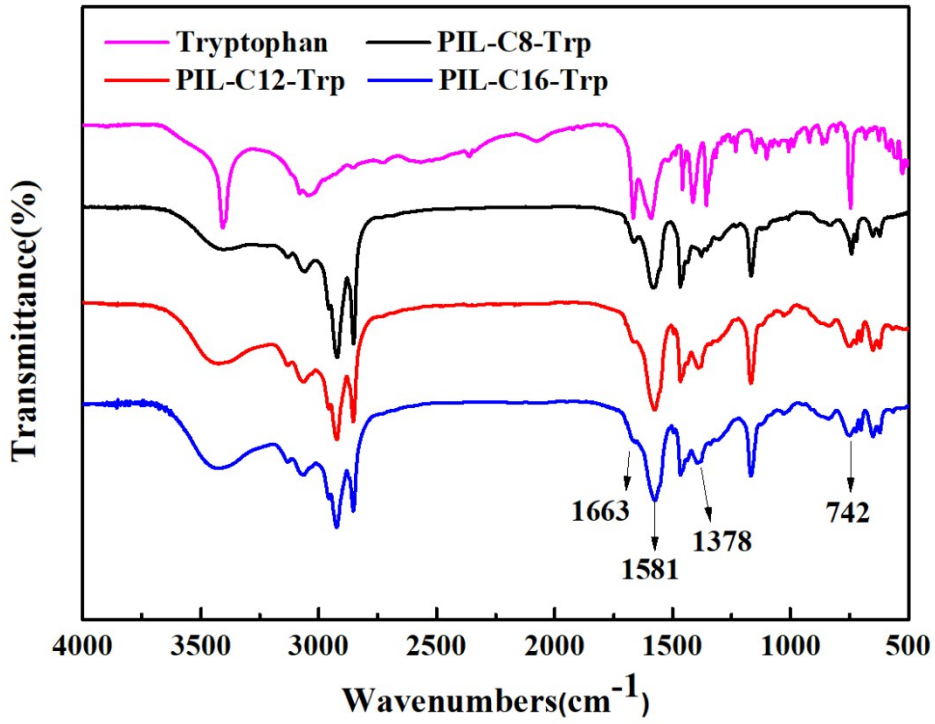

Fig. S6. FT-IR spectra of PIL-Trp.

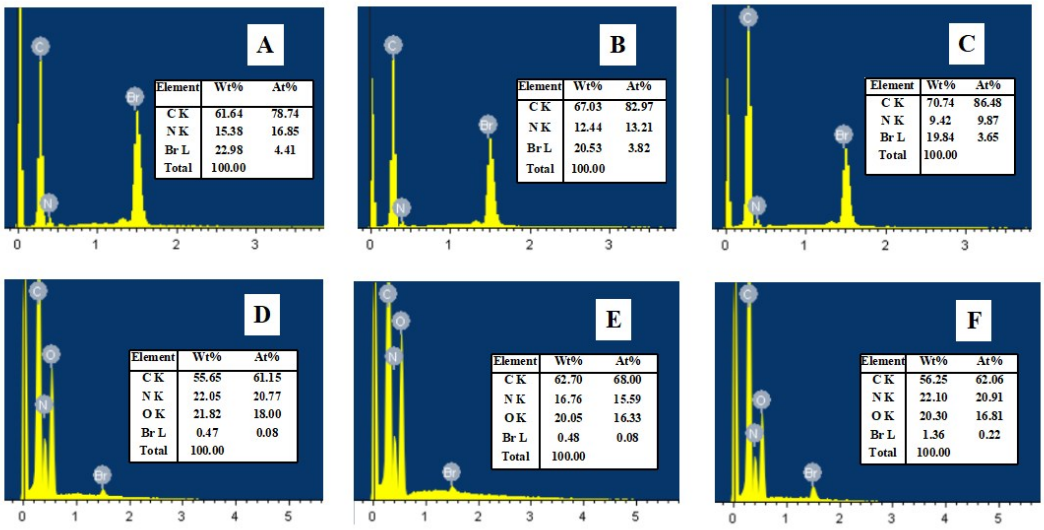

Fig. S7. Energy dispersive X-ray (EDX) spectra of (A)poly[C_8VIm^+][Br^-], (B)poly[$C_{12}VIm^+$][Br^-], (C) poly[$C_{16}VIm^+$][Br^-], (D) poly[C_8VIm^+][Trp^-], (E) poly[$C_{12}VIm^+$][Trp^-] and (F) poly[$C_{16}VIm^+$][Trp^-].

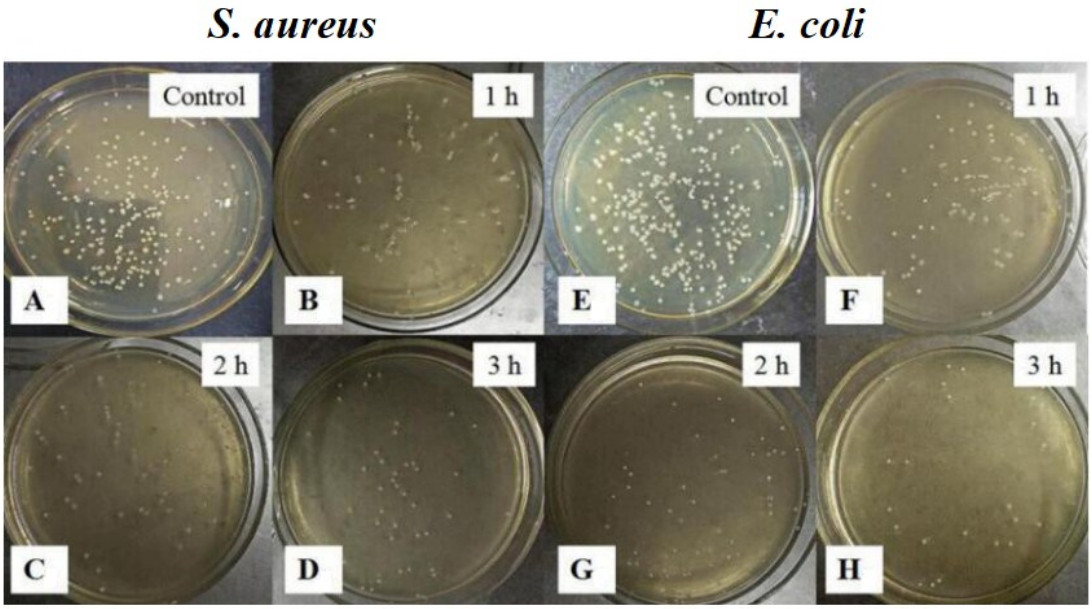

Fig. S8. Number of colony forming units (CFU) of *E. coli* and *S. aureus* after treated with poly[C_8VIm^+][Trp^-] for 1-3 h.

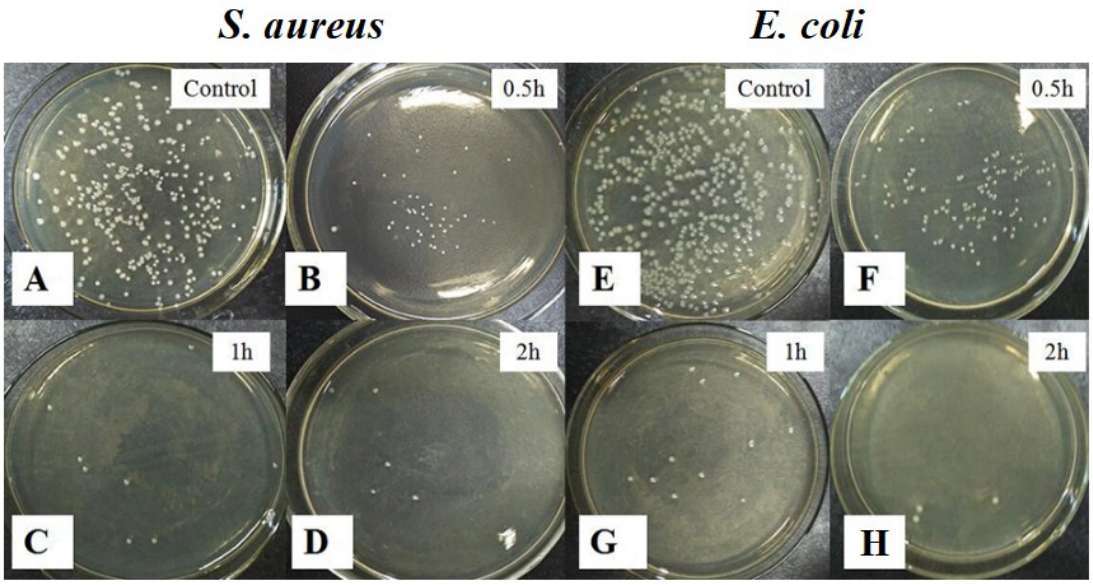

Fig. S9. Number of colony forming units (CFU) of *E. coli* and *S. aureus* after treated with poly[$C_{12}VIm^+$][Trp^-] for 0.5-2 h.

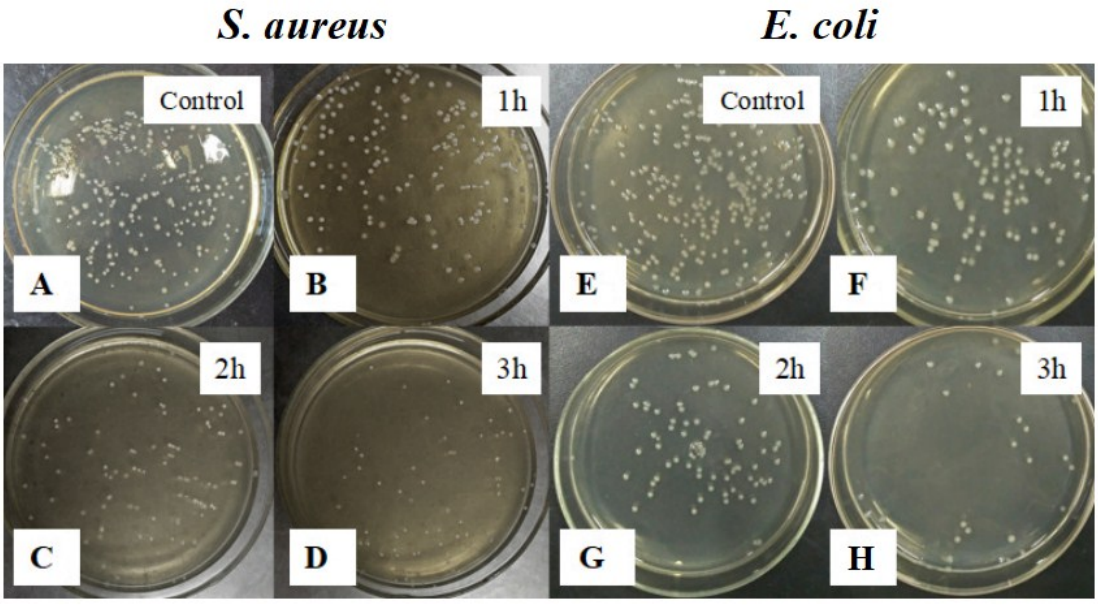

Fig. S10. Number of colony forming units (CFU) of *E. coli* and *S. aureus* after treated with poly[$C_{16}VIm^+$][Trp^-] for 1-3 h.

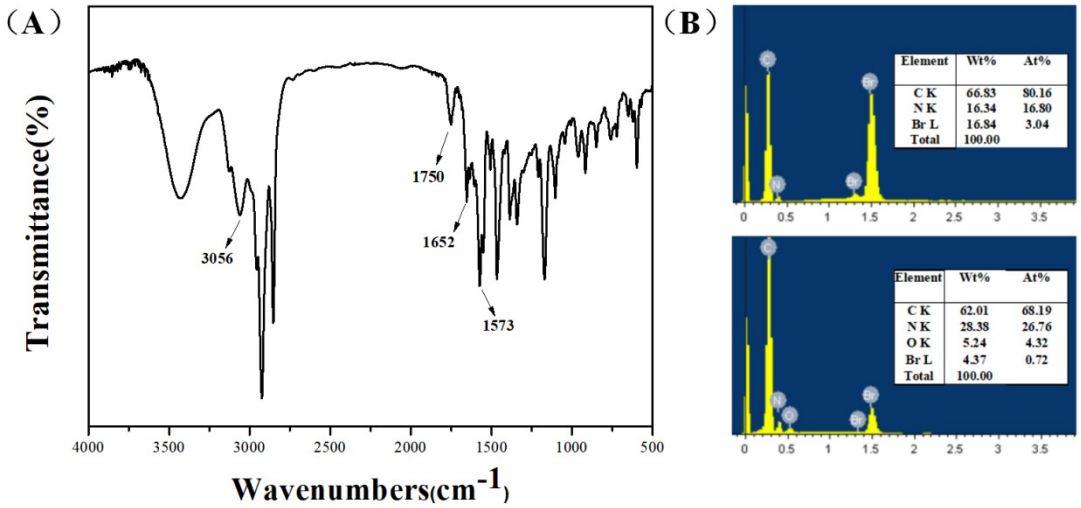

Fig. S11.（A）FT-IR spectra of poly[$C_{12}VIm^+$][Flu^-]；（B）Energy dispersive X-ray (EDX) spectra of the poly[$C_{12}VIm^+$][Br^-] and poly[$C_{12}VIm^+$][Flu^-].