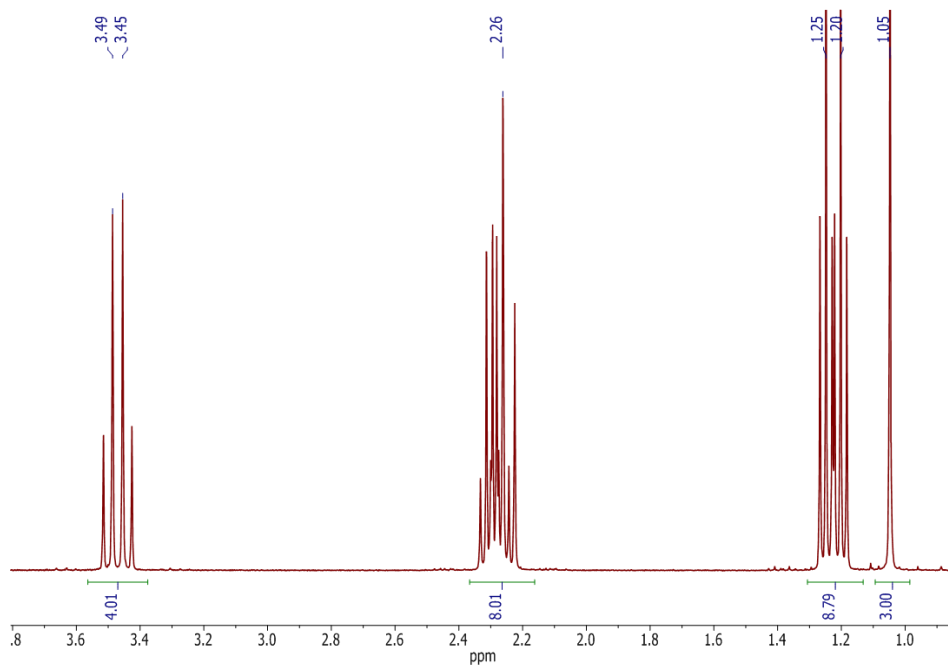


## Supporting Information

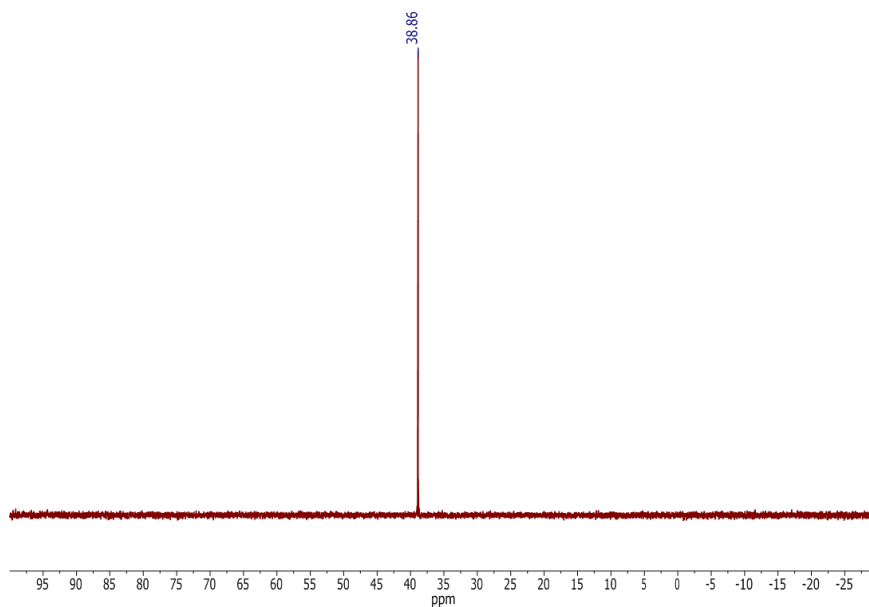
# Water-Dispersible Cationic Polyurethanes Containing Pendant Trialkylphosphoniums

### *Supplemental Experimental Procedures*

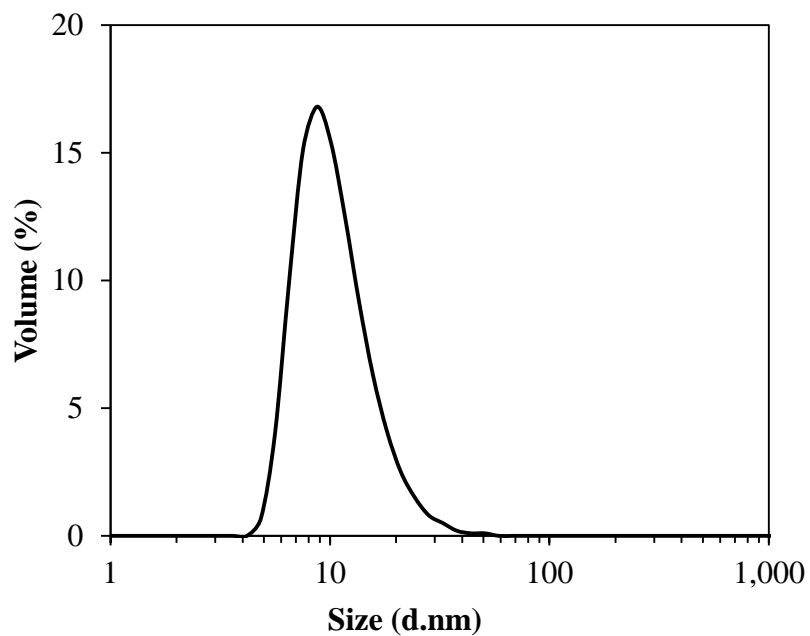
**DNA Binding Assay.** Agarose gels were prepared from 0.6 g agarose, 60 mL of 1x Tris-acetate-EDTA (TAE, Sigma-Aldrich) and 6  $\mu\text{L}$  of SYBR green. Polymer-only solutions (1 mg/mL in deionized water) and plasmid DNA-only solutions (0.2  $\mu\text{L}$  of 1  $\mu\text{g}/\mu\text{L}$  gWiz-Luc in deionized water, Aldevron) were prepared separately from calculated, desired charge ratios. Polyplexes were incubated at 25 °C for 30 min, and 7  $\mu\text{L}$  of DNA loading buffer (30 wt% glycerol in water) was added to the polyplex solution. The polyplex solution (20  $\mu\text{L}$ ) was loaded and electrophoresed in 1x TAE buffer at 70 V for 30 min. DNA gels were imaged using a MultiDoc-it Digital Imaging System (UVP).



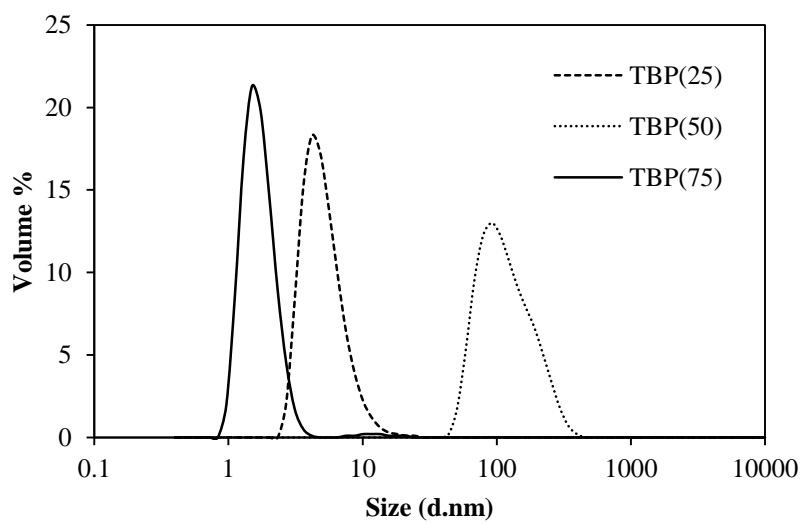
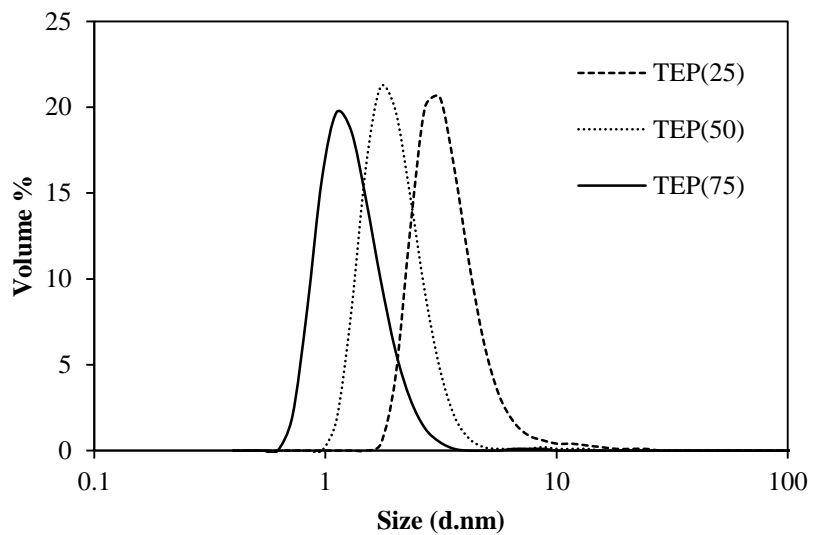
**Figure S 1.**  $^1\text{H}$  NMR spectrum of triethyl(1,3-dihydroxypropyl)phosphonium bromide in  $\text{D}_2\text{O}$ .



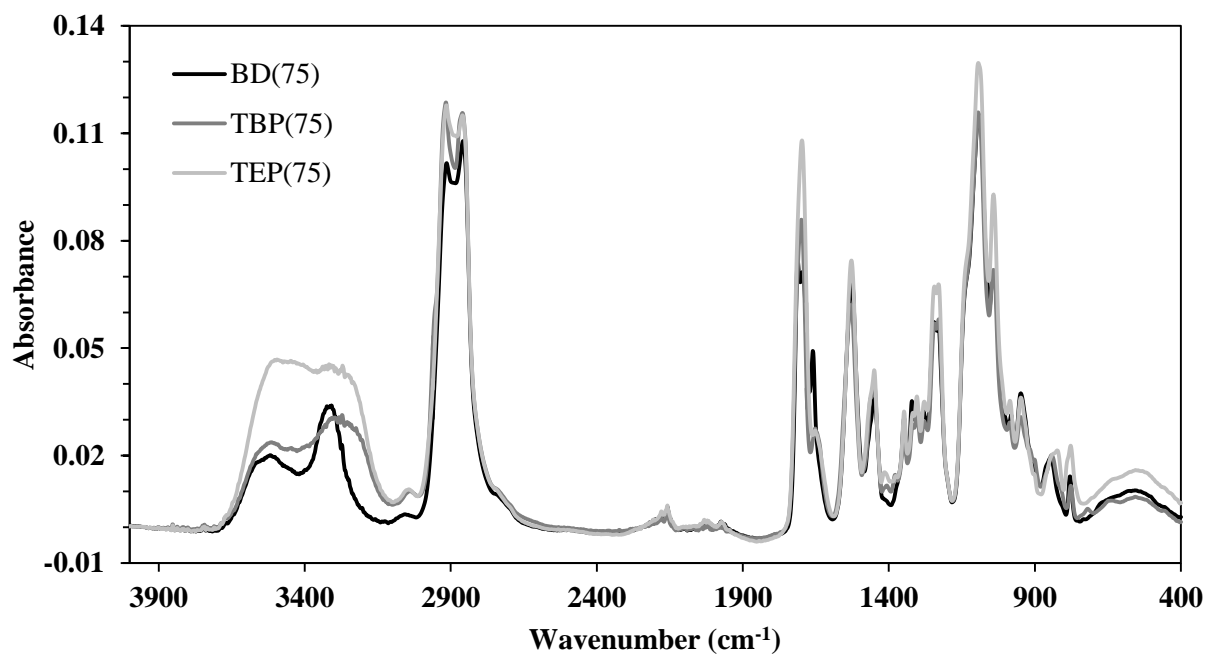
**Figure S 2.**  $^{31}\text{P}$  NMR spectrum of triethyl(1,3-dihydroxypropyl)phosphonium bromide in  $\text{D}_2\text{O}$ .



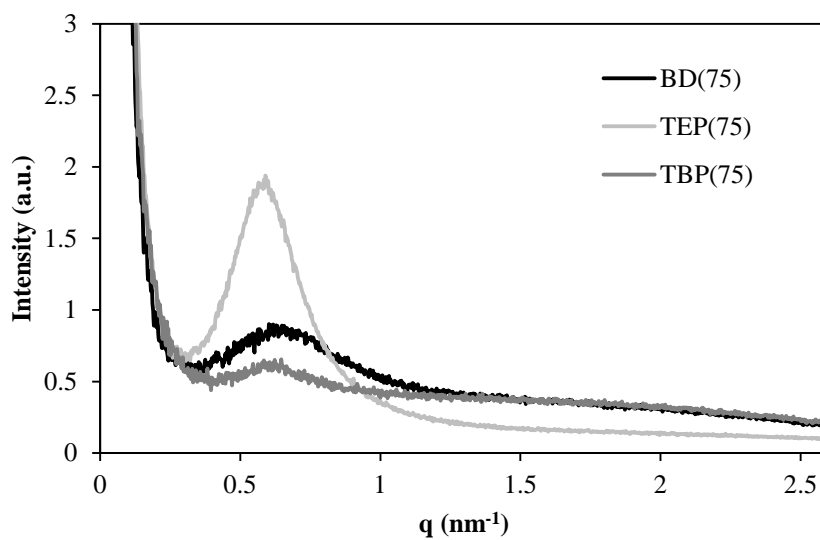
**Figure S 3.** A representative monomodal DLS trace for phosphonium polyurethanes in aqueous SEC solvent (54/23/23 water/methanol/acetic acid (v/v/v %), 0.1 M sodium acetate).



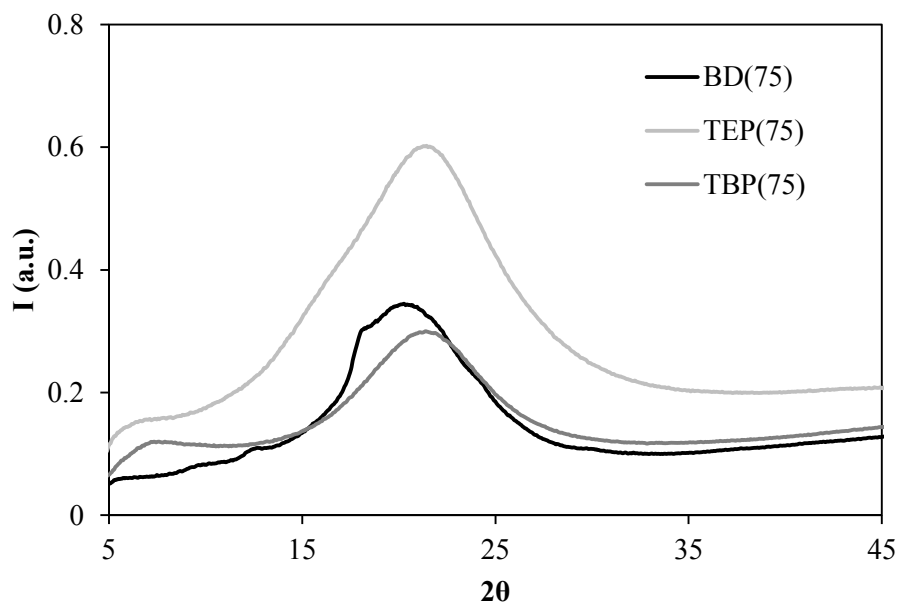
**Figure S 4.** A representative DLS trace for phosphonium polyurethanes in water.



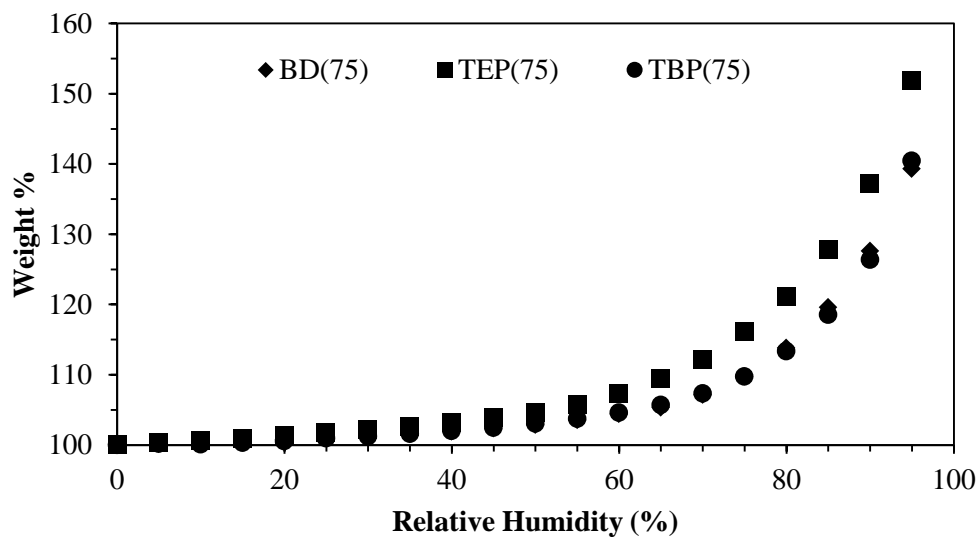
**Figure S 5.** FTIR spectra of BD, TEP, and TBP chain extended PU containing 75 mol% HS.



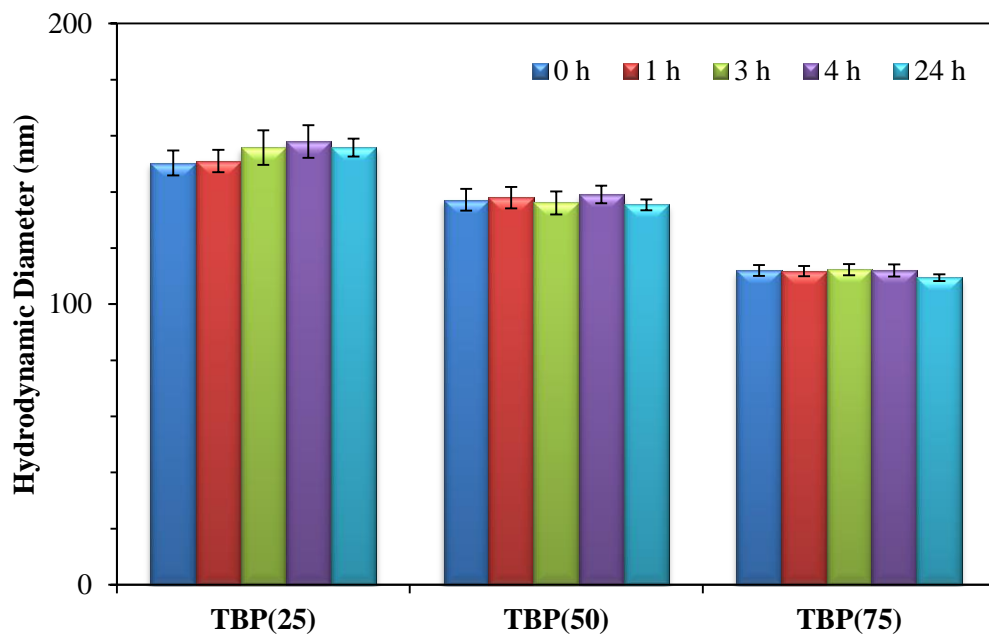
**Figure S 6.** Small-angle X-ray scattering profile of noncharged and phosphonium polyurethanes.



**Figure S 7.** Wide-angle X-ray diffraction (WAXD) of noncharged and phosphonium polyurethanes.



**Figure S 8.** Thermogravimetric sorption analysis of noncharged and phosphonium polyurethanes (75 mol% HS) at 25 °C.



**Figure S 9.** Dynamic light scattering of polyplex stability (+/- ratio = 4) in water over 24 h.