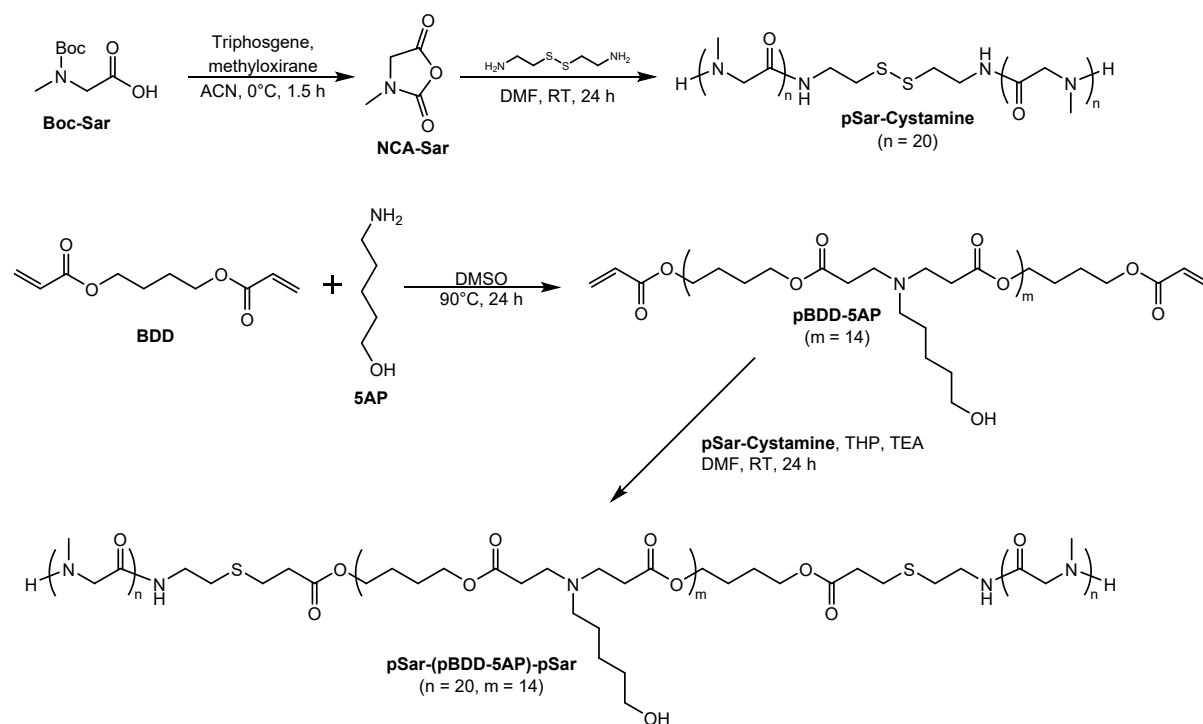
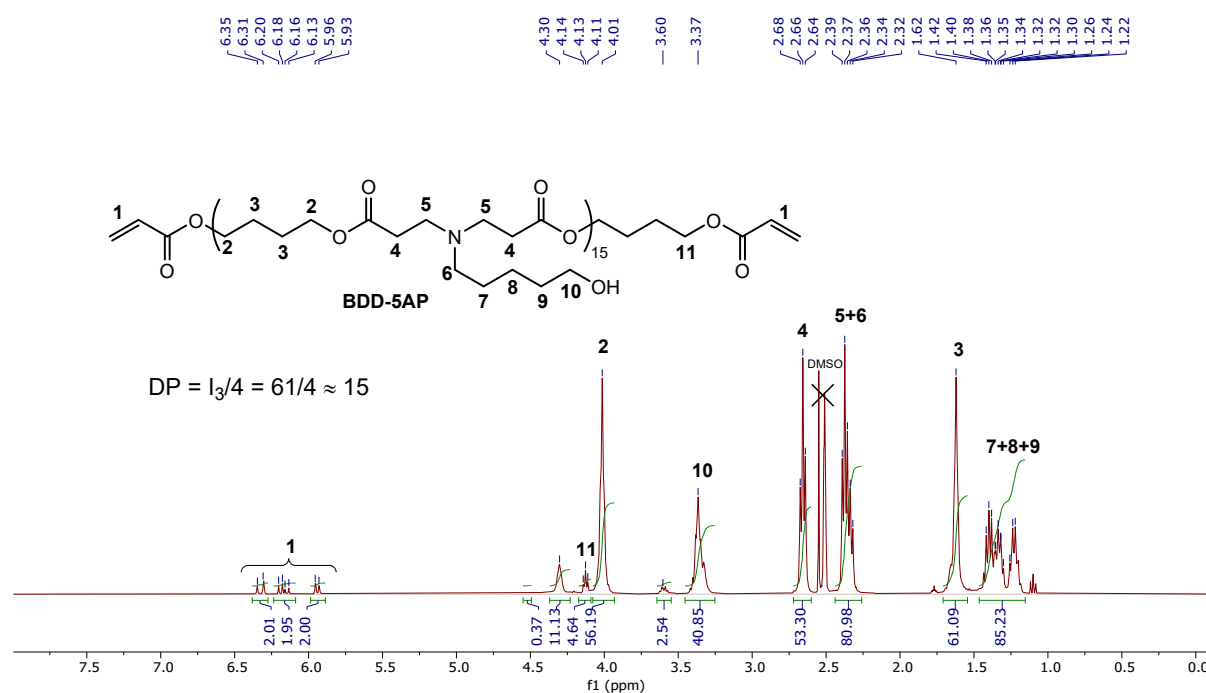


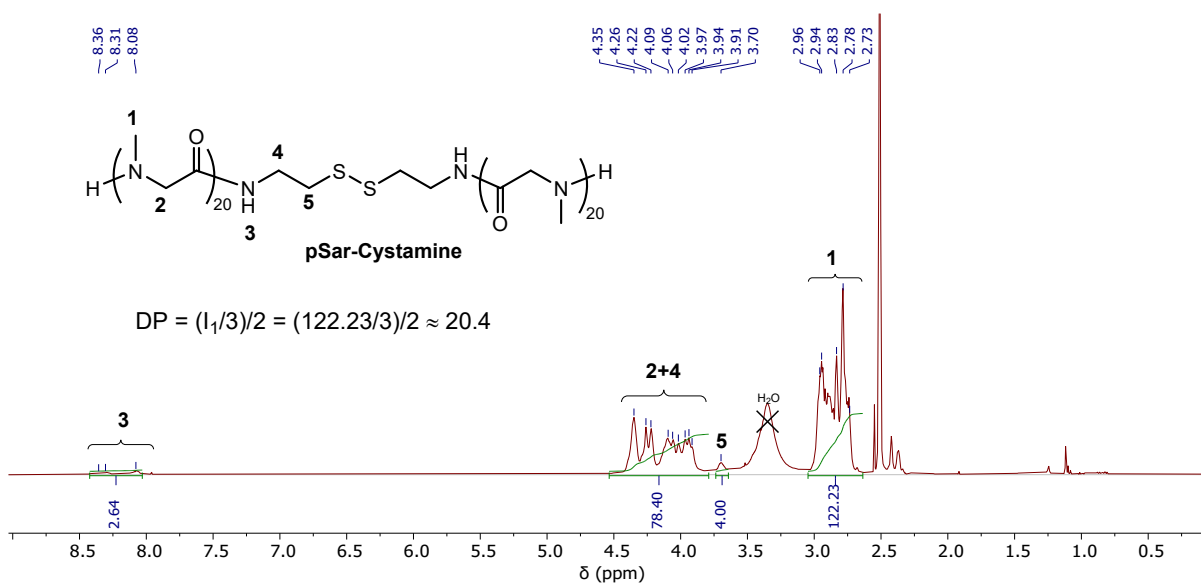
## Supporting Information



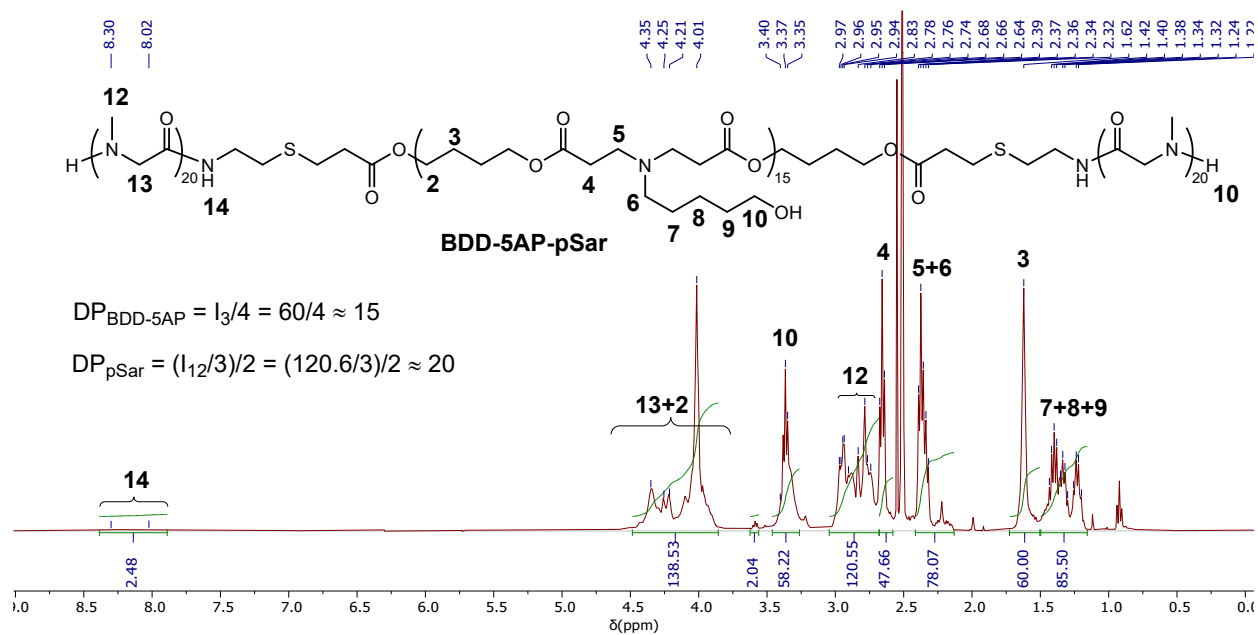
**Scheme S1.** Synthesis scheme of the final block copolymer pSar-(pBDD-5AP)-pSar.



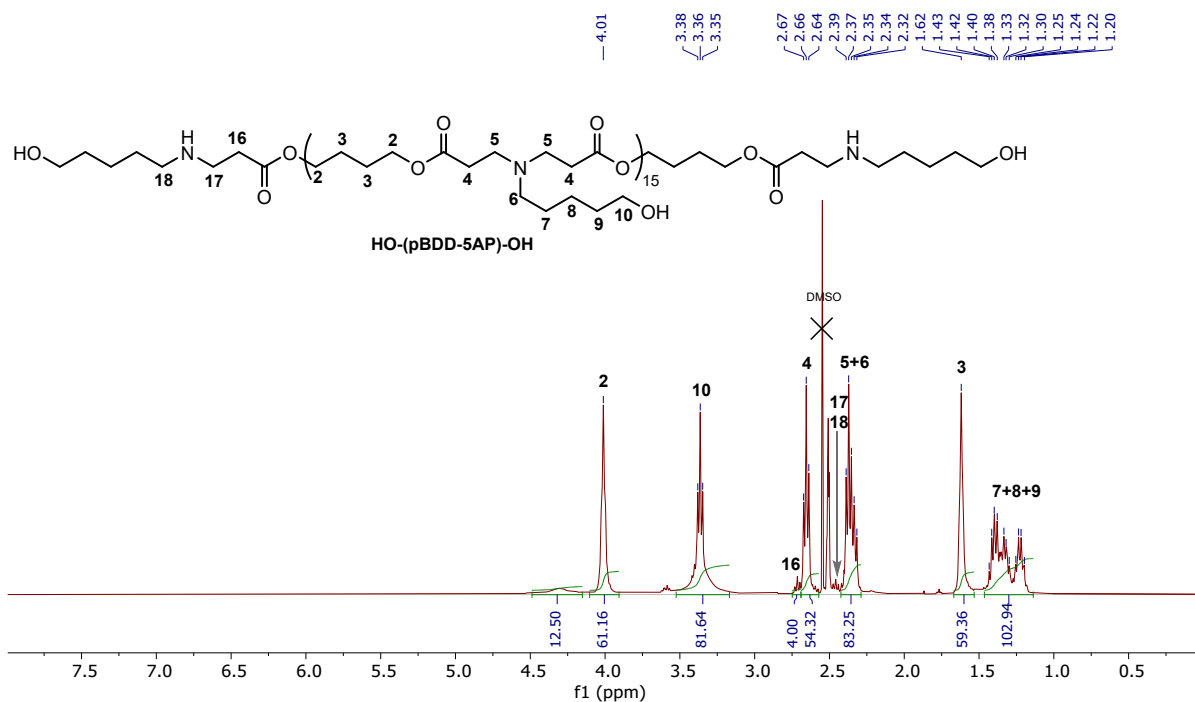
**Spectrum S1.**  $^1\text{H}$  NMR (400 MHz,  $\text{DMSO-d}_6$ ) of pBDD-5AP.



**Spectrum S2.**  $^1H$  NMR (400 MHz, DMSO- $d_6$ ) of pSar-Cystamine.



**Spectrum S3.**  $^1H$  NMR (400 MHz, DMSO- $d_6$ ) of pSar-(pBDD-5AP)-pSar.



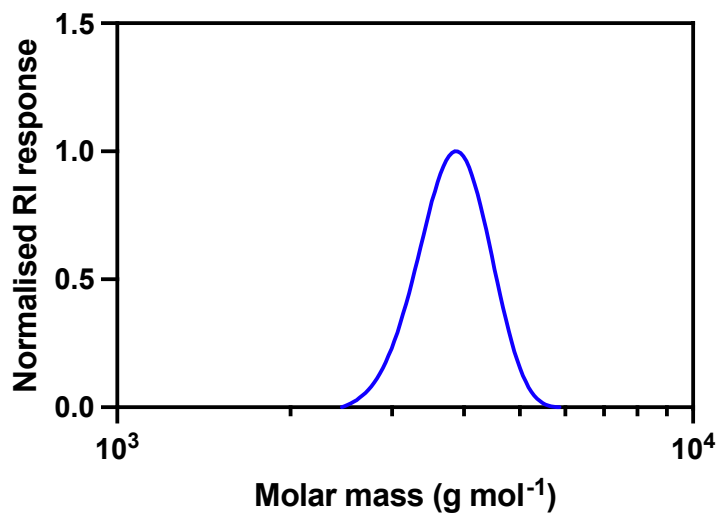
**Spectrum S4.**  $^1\text{H}$  NMR (400 MHz,  $\text{DMSO-d}_6$ ) of HO-(pBDD-5AP)-OH.

**Table S1.** Buffering capacity of studied polymers defined as an amount of an acid required to change pH from 7.4 to 5.0, normalised either to the weight of polymer or mol of ionisable nitrogens.

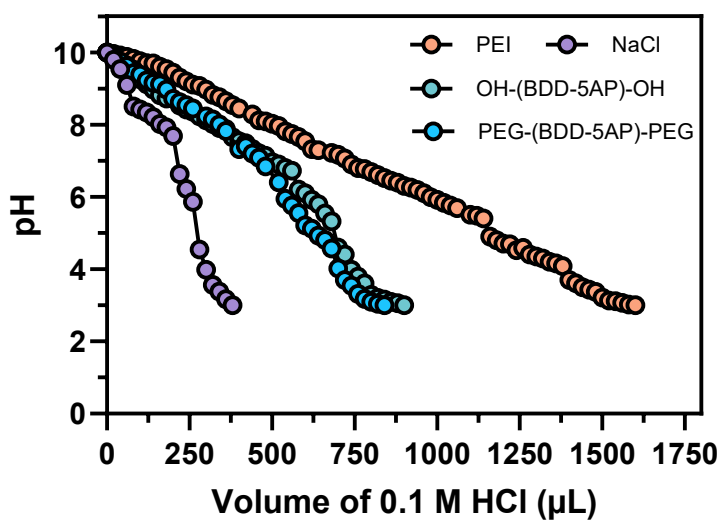
Polymer	Buffering capacity, weight normalised (mmol $\text{H}^+$ /g)	Buffering capacity, mol of ionisable nitrogen normalised
PEI	24	12
OH-(pBDD-5AP)-OH	8	4.0
pSar-(pBDD-5AP)-pSar	7	3.5

**Table S2.** Comparison of w/w ratio and N/P ratio of OH-(pBDD-5AP)-OH and pSar-(pBDD-5AP)-pSar

Polymer	DNA/PBAE w/w ratio	N/P ratio
OH-(pBDD-5AP)-OH	32	35
	64	70
	128	140
pSar-(pBDD-5AP)-pSar	32	22.5
	64	45
	128	90



**Figure S1.** DMF-SEC chromatogram of pSar-Cystamine



**Figure S2.** Buffering capacity of OH-(pBDD-5AP)-OH and pSar-(pBDD-5AP)-pSar compared to polyethylene imine (PEI) and negative control of a 0.1 M NaCl<sub>(aq)</sub> solution.