** Syntheses of monomers 

**Methacryloylamino-2-hydroxypropane (M1)**

A solution of methacryloyl chloride (2.72 g, 26.0 mmol) in dry dichloromethane (40 mL) was added dropwise to a mixture of 1-aminopropan-2-ol (4.21 g, 56.1 mmol) in dry dichloromethane (40 mL) at 8°C under an argon atmosphere. The precipitating solid was filtered off and the solvent was removed under reduced pressure. After purification by chromatography over silica gel, eluting with dichloromethane/methanol 14:1 v/v (Rf=0.32) a colorless solid was obtained. Yield: 1.80 g (12.6 mmol; 48%); 1H NMR (200 MHz, CDCl3): d=1.21 (d, 2J=6.4 Hz, 3 H), 1.98 (dd, 4J=1.5, 1.0 Hz, 3 H), 2.51 (br s, 1H), 3.18 (ddd, 2J=14.0, 3J=7.5, 5.3 Hz, 1 H), 3.51 (ddd, 2J=14.0, 3J= 6.5, 3.0 Hz, 1H), 3.96 (dqd, 3J=7.5, 6.4, 3.0 Hz, 1 H), 5.36 (qd, 4J=1.5, 2J=1.4 Hz, 1H), 5.74 (dq, 2J=1.4, 4J=1.0 Hz, 1H), 6.38 ppm (br s, 1H).
5-Nitro-\textit{m}\text{-}xylylene bisphosphonic acid tetramethylester.\textsuperscript{S2} 5-Nitro-\textit{m}\text{-}xylylene (9.52 g, 63.0 mmol, 1.0 eq) is dissolved in 165 mL of tetrachloromethane. \textit{N}-Bromosuccinimide (24.83 g, 139.5 mmol, 2.2 eq) and a catalytic amount of \(\alpha\alpha\'-\text{azobisisobutyronitrile}\) are added and the mixture is refluxed for 13 hours. After filtering off the insoluble succinimide, the solvent is removed under reduced pressure. The remaining yellow oil is recrystallized from 7 mL of ethyl acetate and 15 mL of \textit{n}\text{-}hexane. Subsequently the resulting yellowish solid (7.9 g crude product) is dissolved in an excess of trimethylphosphite (9.99 g, 80.5 mmol, approx. 3.1 eq) and the solution is refluxed for 5 hours. The volatile components are removed in vacuo and the product is purified by chromatography over silica gel eluting with dichloromethane/methanol (14:1 v/v, \(R_F = 0.29\)). Yield: 4.10 g yellowish solid (11.2 mmol, 18 % over 2 steps). 1H-NMR (CDCl\textsubscript{3}; 200 MHz): \(\delta\text{(ppm)} = 3.25\) (d, \(2J_{\text{H},\text{P}} = 22.0\) Hz, 4H); \(3.73\) (d, \(3J_{\text{H},\text{P}} = 11.0\) Hz, 12H); 7.57-7.62 (m, 1H); 8.04-8.07 (m, 2H). 31P\{1H\}-NMR (CDCl\textsubscript{3}; 81 MHz): \(\delta\text{(ppm)} = 27.3\) (s).

5-Amino-\textit{m}\text{-}xylylene bisphosphonic acid tetramethylester.\textsuperscript{S2} Palladium on Carbon (0.93 g, 10% Pd = 93 mg, 0.9 mmol, 7.8 mol%) is added to a solution of 5-nitro-\textit{m}\text{-}xylylene bisphosphonic acid tetramethylester (4.10 g, 11.2 mmol). The reaction mixture is stirred for 15 hours under a hydrogen atmosphere (atmospheric pressure). After filtering off the catalyst over celite, the solvent is removed under reduced pressure. Yield: 3.20 g slightly yellow solid (9.5 mmol, 85 %).1H-NMR (CDCl\textsubscript{3}; 200 MHz): \(\delta\text{(ppm)} = 3.06\) (d, \(2J_{\text{H},\text{P}} = 21.8\) Hz, 4H); \(3.06\) (sb, 2H); \(3.68\) (d, \(3J_{\text{H},\text{P}} = 10.8\) Hz, 12H); 6.53-6.58 (m, 2H); 6.56-6.61 (m, 1H).31P\{1H\}-NMR (CDCl\textsubscript{3}; 81 MHz): \(\delta\text{(ppm)} = 29.5\) (s).

5-(Methacryloylamino)-\textit{m}\text{-}xylylene bisphosphonic acid tetramethylester (M2).\textsuperscript{S2} 5-Amino-\textit{m}\text{-}xylylene bisphosphonic acid tetramethylester (900 mg, 2.7 mmol, 1.0 eq), triethylamine (320 mg, 3.2 mmol, 1.18 eq) and catalytic amount of 4-(\(N\),\(N\)-dimethylamino)pyridine are dissolved in 30 mL of dichloromethane. A solution of methacryloyl chloride (0.42 g, 4.0 mmol; 1.51 eq) and 8 mL of dichloromethane is added dropwise at 0°C within 1
hour. Stirring is continued for 1 hour at room temperature. Subsequently the organic layer is washed with 30 mL 0.6 N NaOH and dried in vacuo. The received crude product is purified by chromatography over silica gel eluting with dichloromethane/methanol (19:1 v/v, Rf=0.09). Yield: 0.90 g colourless highly viscous oil (2.2 mmol; 83 %). 1H-NMR (CDCl3; 200 MHz): δ(ppm) = 2.06 (dd, 4JH,H= 1.5 Hz, 4JH,H= 1.0 Hz, 3H); 3.15 (d, 2JH,P= 22.0 Hz, 4H); 3.70 (d, 3JH,P= 10.8 Hz, 12H); 5.47 (qd, 1H); 5.79 (qd, 1H); 6.97-7.01 (m, 1H); 7.47-7.50 (m, 2H); 7.69 (sb, 1H). 31P{1H}-NMR (CDCl3; 81 MHz): δ(ppm) = 28.9 (s). MS (ESI pos., MeOH); m/z: 444 [M+K]+, 428 [M+Na]+, 406 [M+H]+. HRMS (ESI pos., MeOH) calcd. For C16H25NNaO7P2 [M+Na]+ m/z: 428.1004, found: m/z: 428.1011; elemental analysis: calcd: C 47.41%; H 6.22%; found: C 47.71%; H 6.41%.
Test of reusability of protein adsorbers

The reusability of neutral poly(M1-co-M2)-grafted membranes was tested in repeated bind-wash-elute-regenerate cycles (cf. Experimental Section); the results are summarized in Figure S1.

![Graph showing Lysozyme binding capacity](image)

**Figure S1.** Lysozyme binding capacity in repeated bind-wash-elute-regenerate cycles (binding: from 1 mL protein solution with a concentration of 35 µg/mL in 25 mM HEPES buffer, pH 7.1; washing: 3 times with 2 mL buffer for 20 min; elution: with 1 mL 25 mM HEPES buffer containing 1 M NaCl overnight; regeneration: in excess of 25 mM HEPES buffer, pH 7.1 overnight).

**References**
