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Electronic Supplementary Information (ESI)

Modulation of the osteoconductive property and immune response of poly(ether ether ketone) by modification with calcium ions

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Tab. S1. Atomic composition and contact angle (CA) of pNE-coated PEEK prepared in different buffers.

Samples	C/at.%	O/at.%	N/at.%	Ca/at.%	C/O ratio[a]	CA (deg.)[b]	Buffer
pNE-Tris	73.7 ± 0.3	19.9 ± 0.4	6.4 ± 0.1	0.0 ± 0.0	3.7 ± 0.1	41.3 ± 3.4	Tris-HCl (pH 8.5)
pNE-Bicine	73.1 ± 0.4	20.3 ± 0.3	6.7 ± 0.0	0.0 ± 0.0	3.6 ± 0.1	41.3 ± 2.5	Bicine-NaOH (pH 8.6)

Data are means ± S.D. of three independent experiments, determined using XPS.

[a]Theoretical C/O ratios of pristine PEEK and pNE were 6.3 and 2.7–4.0, respectively.

[b]Contact angle of water droplet (1.5 μL) on substrates.

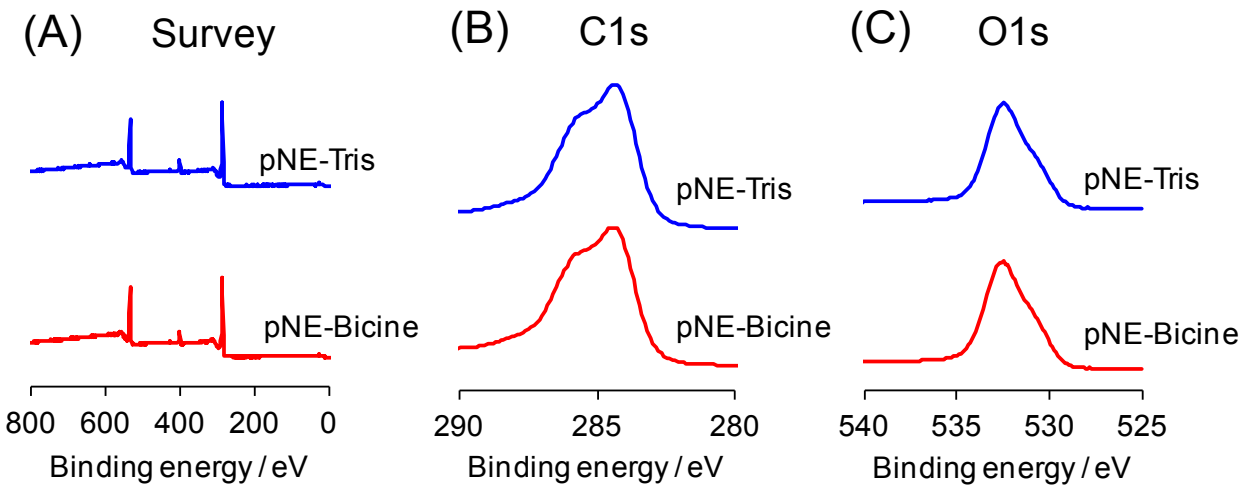

Fig. S1 (A) Survey spectra, (B) C1s spectra, and (C) O1s spectra of pNE-Tris and pNE-Bicine.

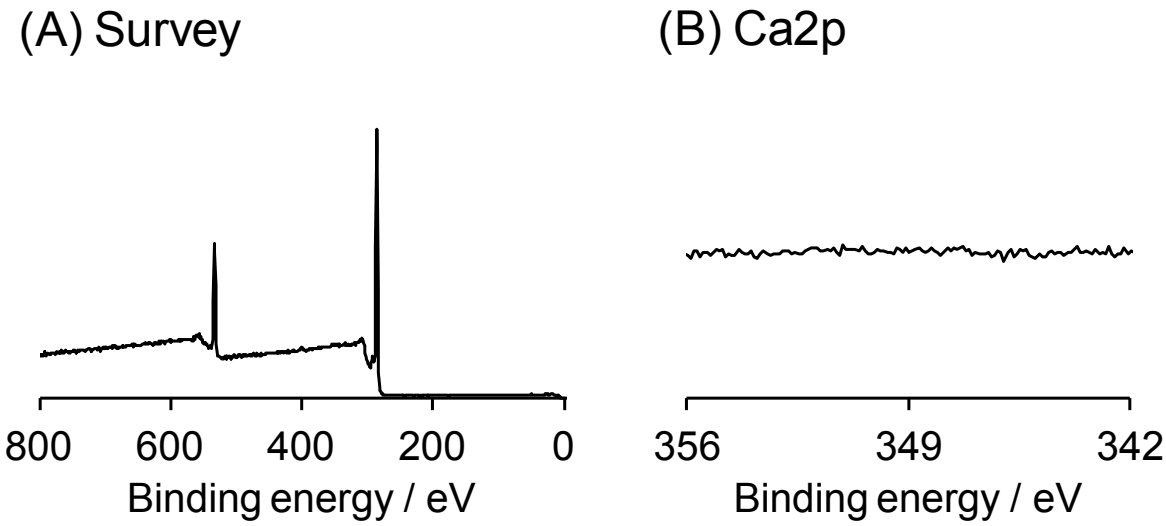

Fig. S2 (A) Survey spectra, and (B) Ca2p spectra of PEEK treated with saturated $Ca(OH)_2$ solution for 15 minutes. Data showed that Ca ions could not be modified onto PEEK without pNE coating.

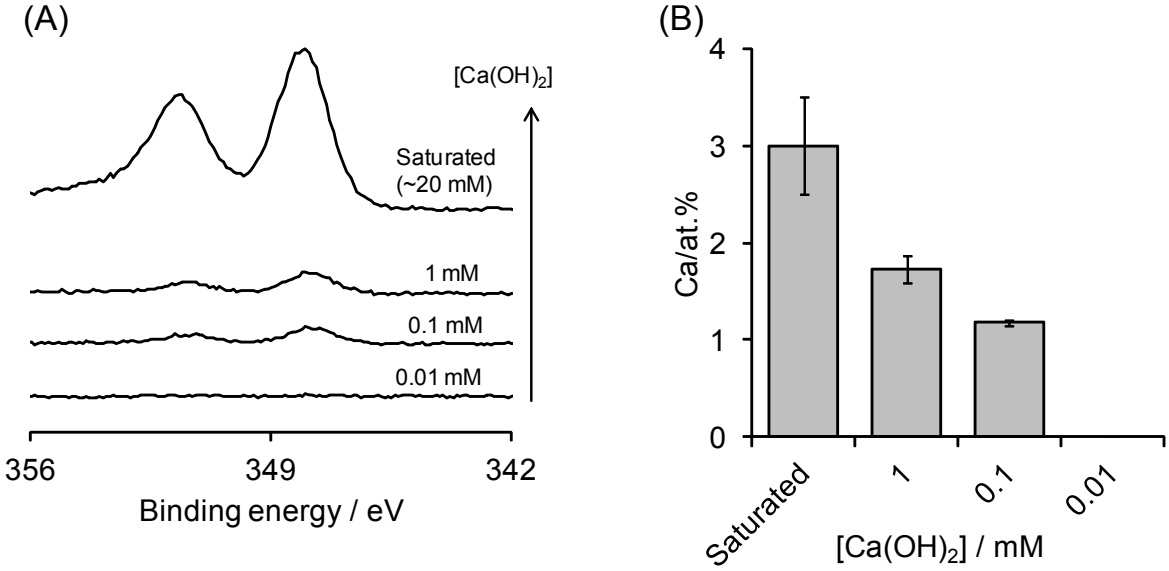

Fig. S3 (A) Typical Ca2p spectra and (B) at.% of Ca2p of pNE treated with various concentration of $Ca(OH)_2$ solution for 15 minutes. Data are means ± S.D. of four independent experiments.

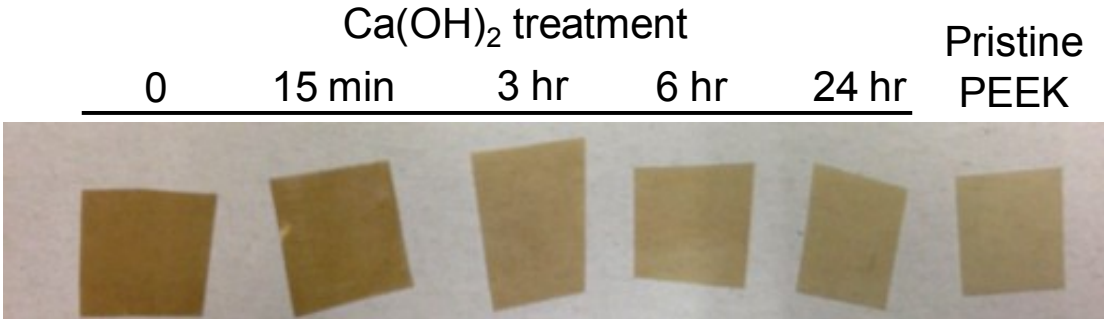

Fig. S4 Detachment of pNE coating from samples during saturated $Ca(OH)_2$ treatment. Three hr after $Ca(OH)_2$ treatment, color of sample changed from brown to fresh, indicating longer $Ca(OH)_2$ treatment caused the pNE coating to detach from PEEK.

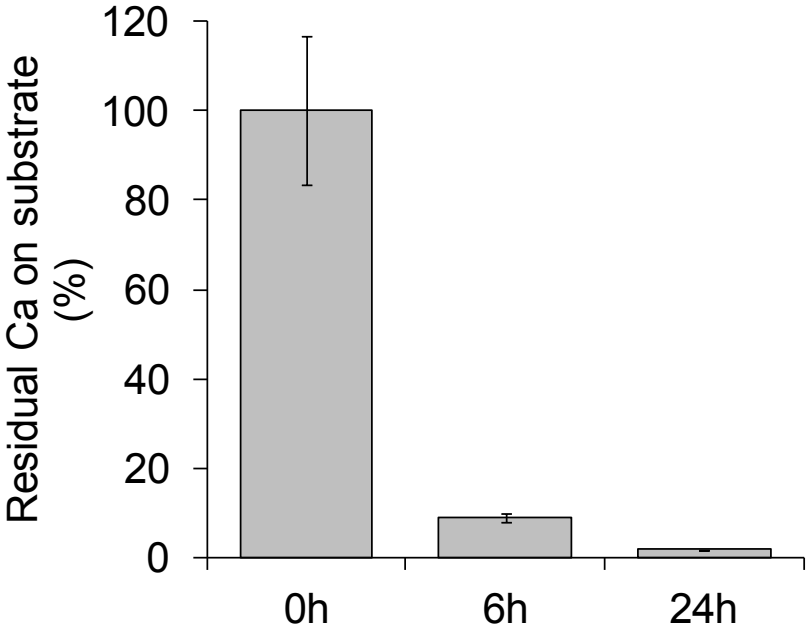

Fig. S5 Release of Ca ions from pNE-Ca in PBS. At.% of Ca2p on pNE-Ca 6 and 24 h after incubating in PBS was measured using XPS. Data are normalized with initial at.% of Ca2p and represent means ± S.D. of four independent experiments.

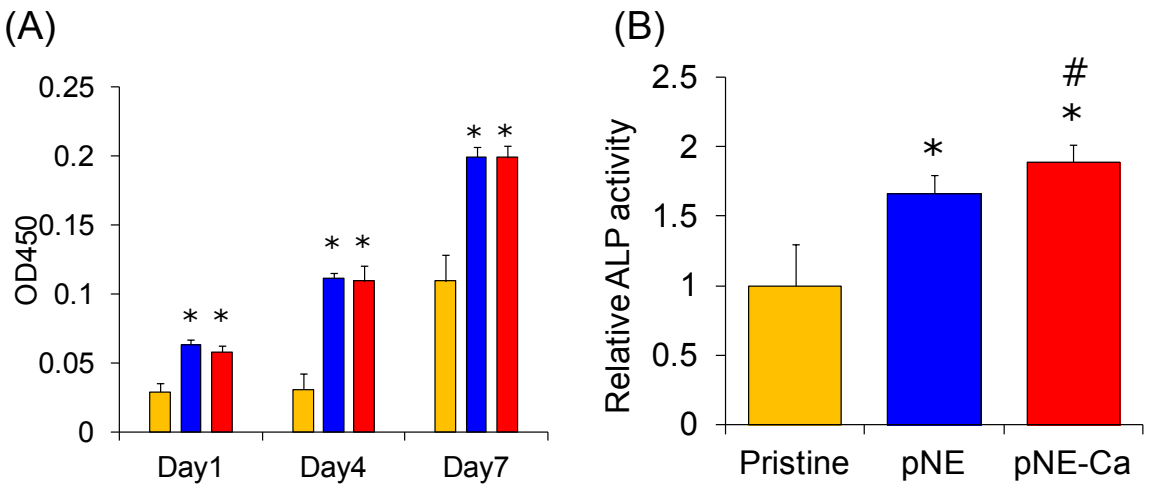

Fig. S6 Human MSC responses on various PEEK samples. (A) Proliferation of hMSC on various PEEK samples. (B) ALP activity of hMSCs 7days after culturing in differentiation medium. Data are means ± S.D. of four independent experiments. *p<0.05 (vs Pristine) and $^{\#}p$<0.05 (vs pNE) indicate significant differences between groups.

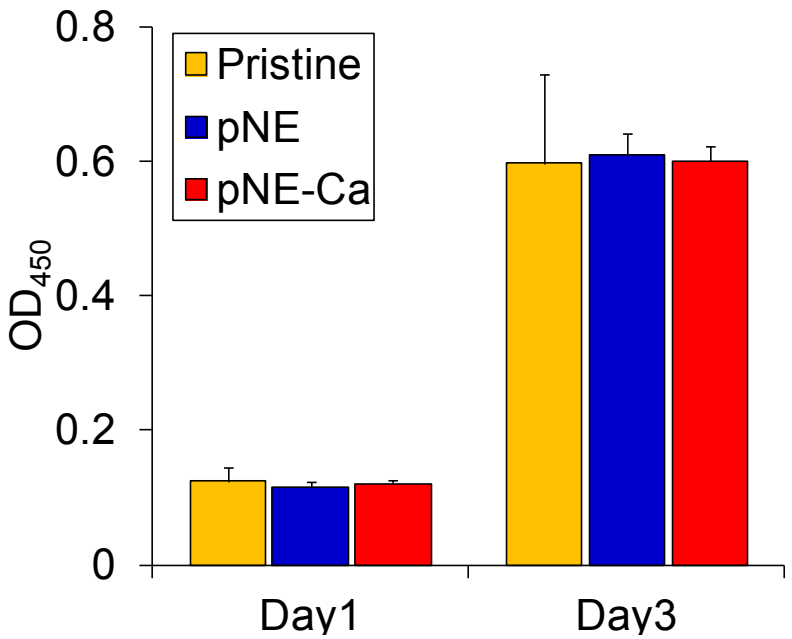

Fig. S7 Proliferation of RAW264.7 Mφ on various PEEK samples. Data are means ± S.D. of four independent experiments.

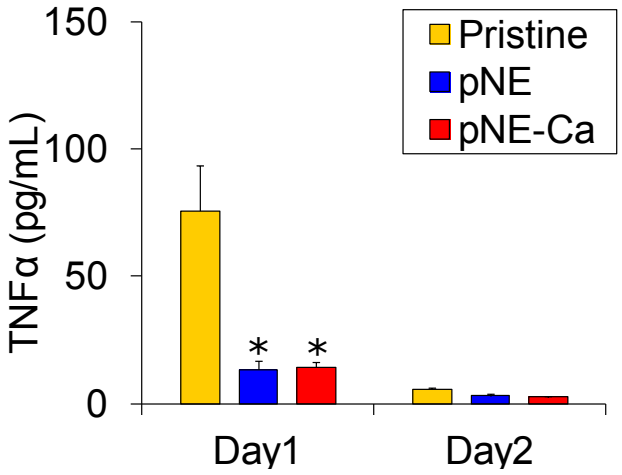

Fig. S8 TNFα production by RAW264.7 macrophage cells without stimulation. It should be noted that the amounts of IL-1a, IL-4, and IL-10 were below the detection limit if RAW264.7 macrophages were not stimulated by LPS. Data are means ± S.D. of four independent experiments. *p<0.05 (vs Pristine) indicates a significant difference between groups.