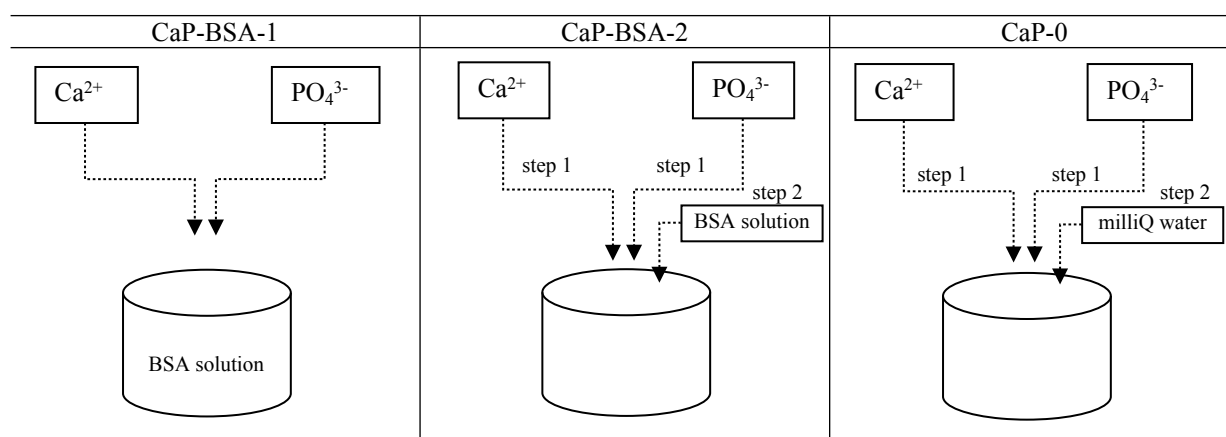


Electronic Supplementary Information

Protein-calcium phosphate nanocomposites: Benchmarking protein loading via physical and chemical modifications against co-precipitation

Vinayaraj Ozhukil Kollath,* Steven Mullens, Jan Luyten, Karl Traina and Rudi Cloots*

The protocols are represented schematically in scheme S1 below,



Scheme S1 Representations of the protocols.

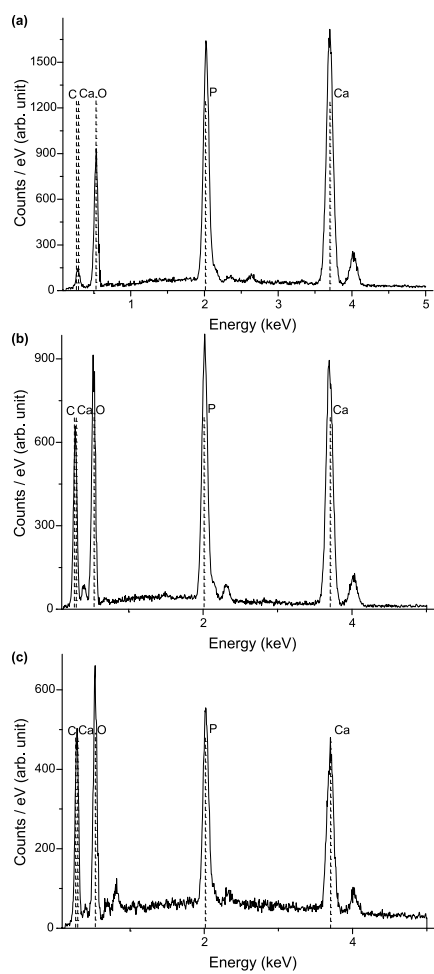


Fig. S1 Energy dispersive spectra of (a) CaP-0, (b) CaP-BSA-1 and (c) CaP-BSA-2.

Commercial calcium phosphate powders

BSA loading of calcium phosphate (CaP) nanocomposites described in the manuscript has been compared with commercially available CaP powders in raw and physiochemically modified forms. Physical processing (Fig. 6) was carried out on β -tricalcium phosphate (TCP) powder bought from Fluka, Germany [Ozhukil Kollath et al., 2013]. Table S1 lists the powder nomenclature and corresponding specific surface areas (SSA). Nanocrystalline hydroxyapatite (HA) powder HA1 was procured from Merck, Germany and heat treated to yield two more HA powders (HA2, HA3) with different SSA. Two HA powders, different in Ca/P ratio (HA4, HA5) were kindly supplied by Plasma & Ceramic Technologies Ltd. (PCT), Latvia. Another low SSA powder (HA6) was kindly supplied by Altakitin S. A., Portugal.

All the wet-chemical and atmospheric pressure (AP) plasma modifications were performed on HA1 (see Fig. 6 in the main text). Lysine functionalisation on HA was repeated on HA5 to prove the repeatability of the functionalisation method (see Fig. 6 in the main text).

Table S1 Various commercial CaP powders investigated and their SSA values.

No.	Powder name	Manufacturer	Pre-treatment	SSA (m ² g ⁻¹)
1	TCP1	Fluka, Germany	/	3.4
2	HA1	Merck, Germany	/	63
3	HA2		2 h at 500 °C	43
4	HA3		2 h at 700 °C	30
5	HA4 (Ca/P=1.66)	PCT, Latvia	/	18.5
6	HA5 (Ca/P=1.77)	PCT, Latvia	/	90.4
7	HA6	Altakitin, Portugal	/	1

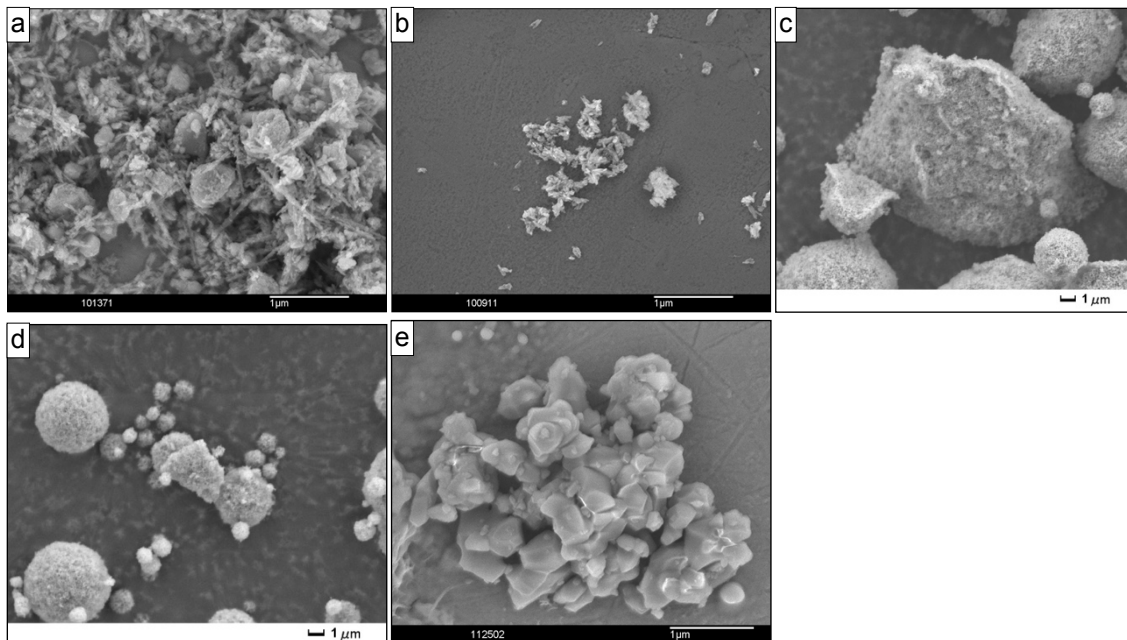


Fig. S2 Scanning electron micrographs of (a) TCP1, (b) HA1, (c) HA4, (d) HA5 and (e) HA6 (scale bars are 1 μm).

References

1. Brandes N., Welzel P. B., Werner C. and Kroh L. W., *J Colloid Interface Sci*, 2006, **299**, 56.
2. Ozhukil Kollath V., De Geest B. G., Mullens S., De Koker S., Luyten J., Persoons R., Traina K., Remon J. P. and Cloots R., *Adv Eng Mater*, 2013, **15**, 295.