

Figure S1 Thermogravimetric analysis (TGA) data of HAP (black) and HAP•ON29 (red) with mass -renormalized to 100% at 120 °C to ignore mass loss by water evaporation of the wet samples. **Inset** Analogous TGA curves before initial dehydration.

Figure S2



Figure S2 Differential analysis of TGA data of HAP•ON29 (left) and HAP (right) highlighting the temperatures and the net mass loss occurring at these temperatures. Overall, accounting for the loss of strongly bound water between 160 and 600 °C, as much as 4.8 weight% of peptide is removed by combustion.



Figure S3 (a) ¹H-³¹P HETCOR of HAP•ON29 with contact time of 4.6 ms., and recycle delay of 1 s. Peak at 0.7 ppm on F1 corresponds to OH⁻ groups. Peak at 5.8 ppm on F1 corresponds to H₂O molecules. **(b)** Slice of ³¹P correlated with OH⁻ groups (blue, peak width at half maximum of 350 Hz) and with H₂O molecules (red, peak width at half maximum of 790 Hz).



Figure S4 Carbonyl and aromatic portion of the 2D 1 H- 13 C HETCOR spectra of HAP•ON29 recorded using 1 H homonuclear decoupling (PMLG) in t₁ and CP contact times of 0.4 ms (green), 1.5 ms (black) and 2.5 ms (red).