Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B

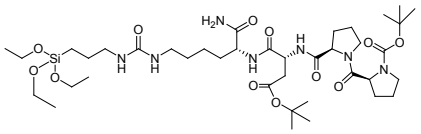
Supplementary Information

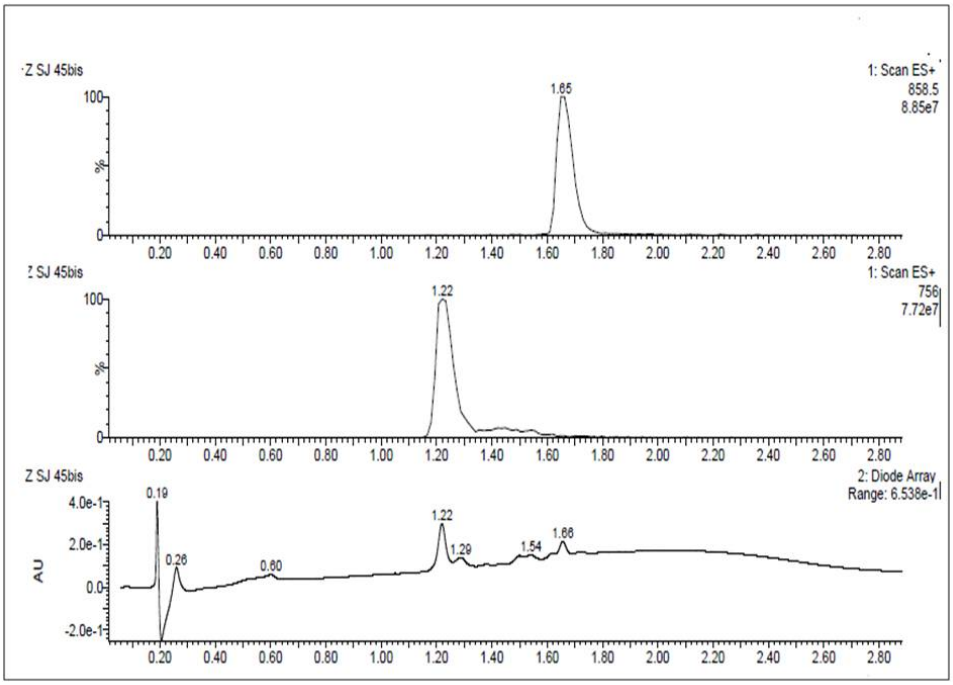
From protected trialkoxysilyl-peptides building blocks to bioorganic-silica hybrid materials

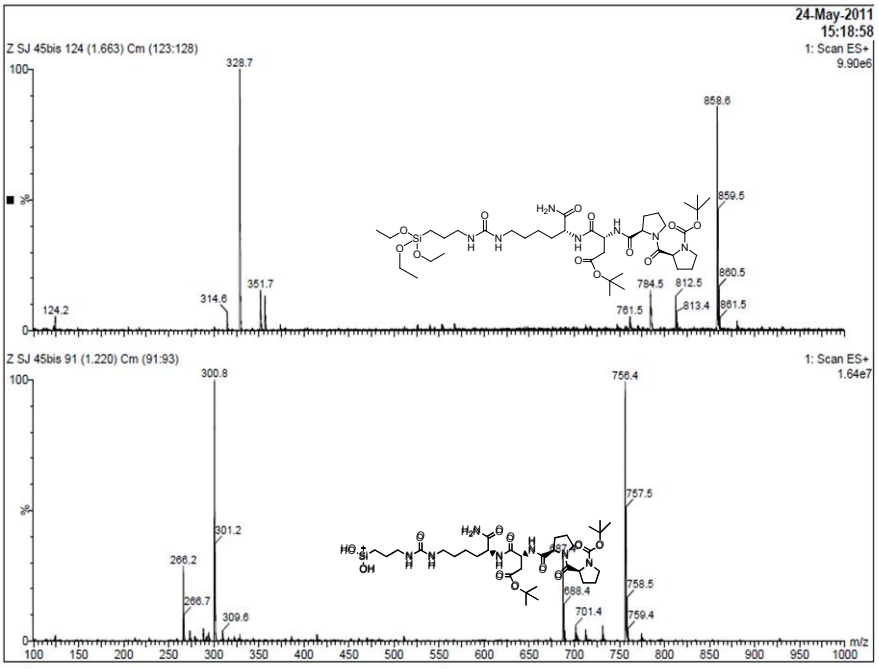
Said Jebors[a], Sebastien Cecillon[b], Clément Faye[c], Christine Enjalbal[a], Muriel Amblard[a], Ahmad Mehdi[d]* Gilles Subra[a]* and Jean Martinez[a]

1.LC and MS data of hybrid peptides

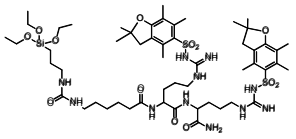
Hybrid peptide **1** Boc-Pro-Pro-Asp(OtBu)-Lys((EtO)$_3$Si(CH$_2$)$_3$NHCO)-NH$_2$

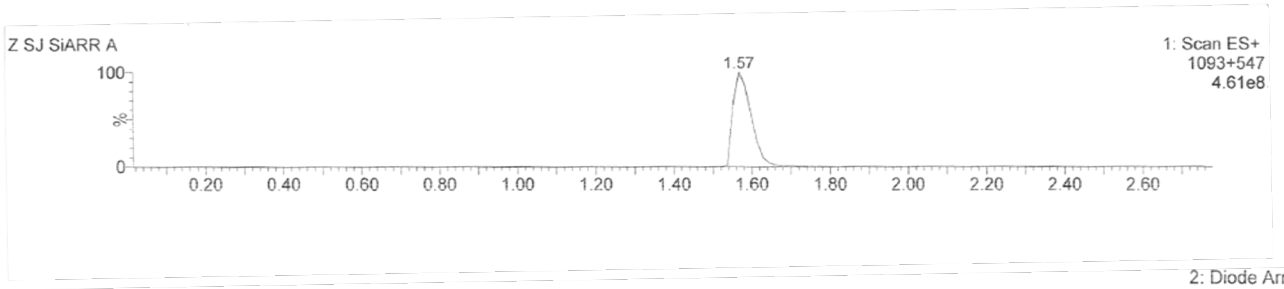


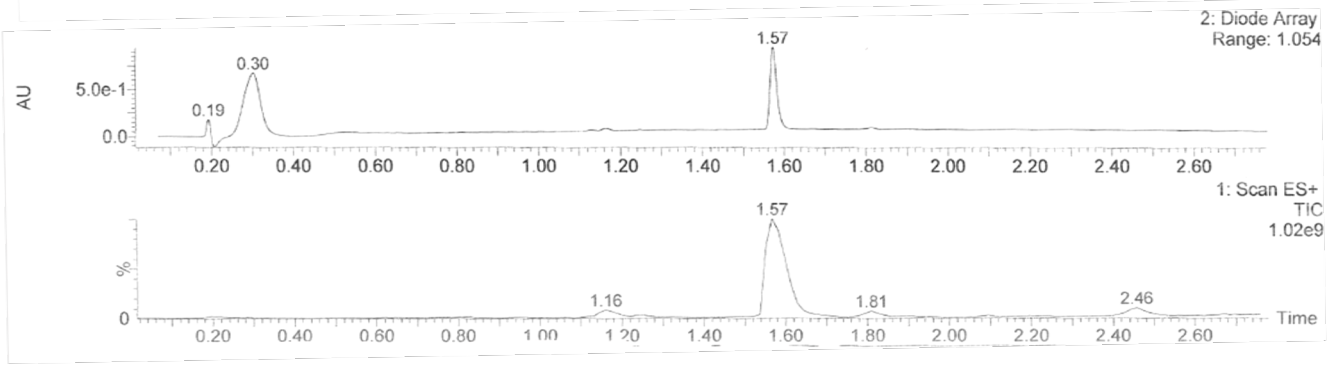


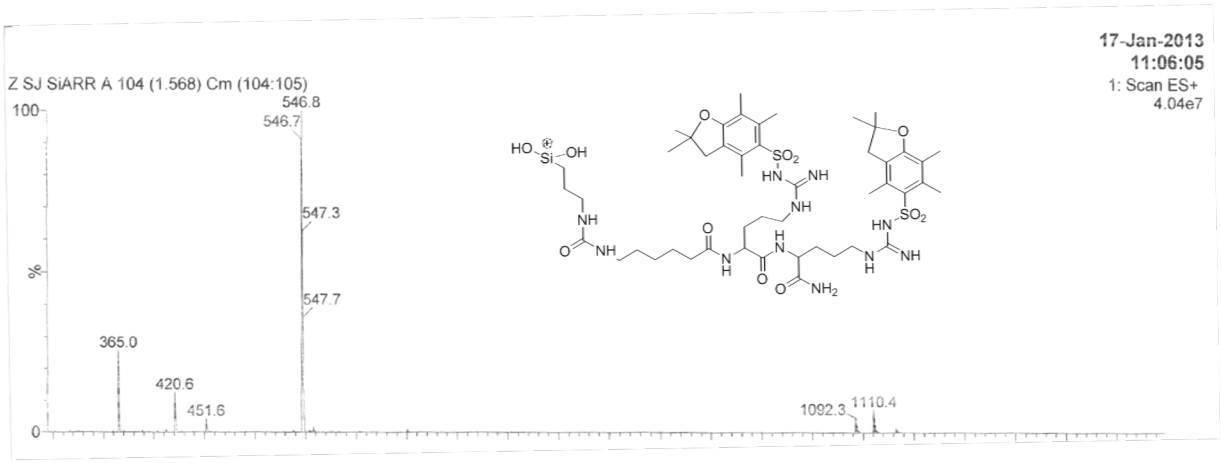


Hybrid peptide **2** $(EtO)_3Si(CH_2)_3NHCO$-Ahx-Arg(Pbf)-Arg(Pbf)-NH_2





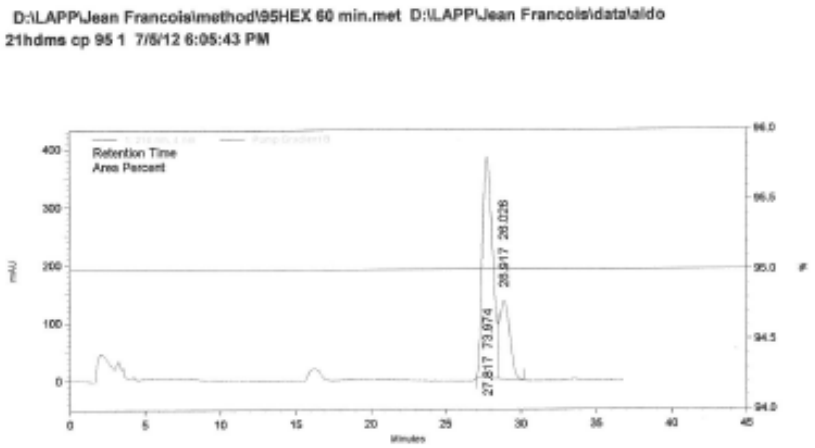




2.Chiral HPLC chromatograms

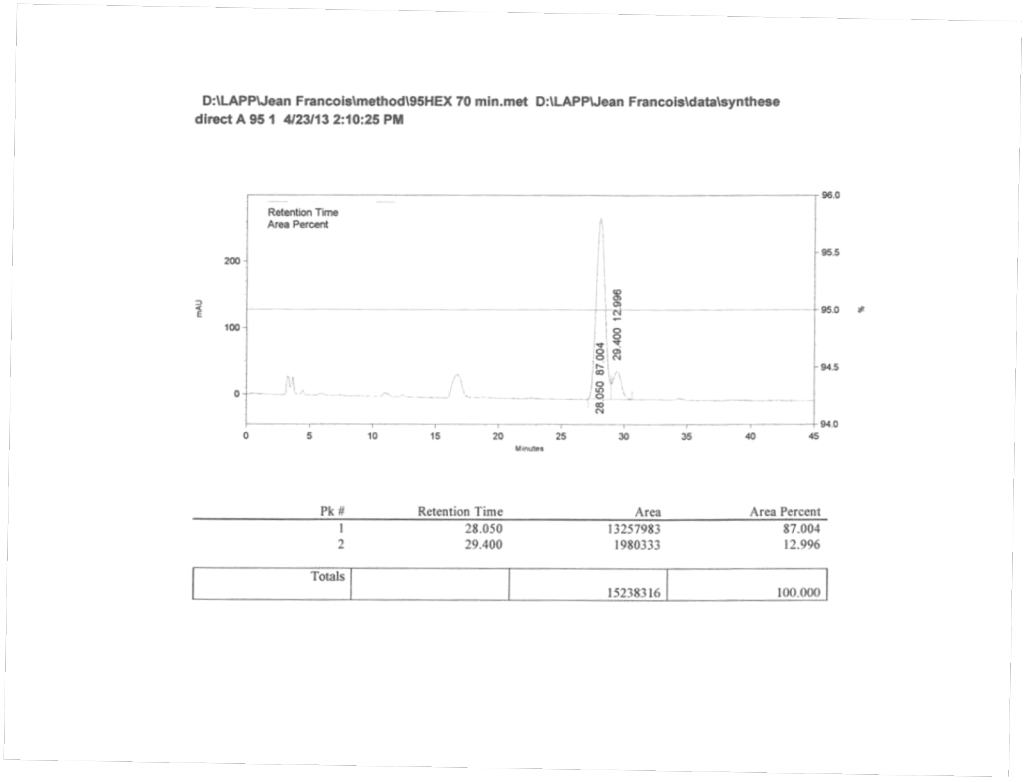
Enantiomeric excess for 4-hydroxy-4-(4-nitrophenyl)butan-2-one (Table 2) determined by chiral-phase HPLC analysis:

HPLC: chiral pack (isopropanol/hexane 5/95 30°C) at 1ml/min. Aldolisation catalysed by **4** in acetone:



Pk #	Retention Time	Area	Area Percent
1	27.817	18016715	73.974
2	28.917	6338885	26.026
Totals		24355600	100.000

HPLC: chiral pack (isopropanol/hexane 5/95 30°C) at 1ml/min. Aldolisation catalysed by **4** in DMSO:



Pk #	Retention Time	Area	Area Percent
1	28.050	13257983	87.004
2	29.400	1980333	12.996
Totals		15238316	100.000

3.ADECA method.

The density of peptides on surface is evaluated by the ADECA method based on the reversible complexation of the Coomassie brilliant blue (CBB) with the ammonium and guanidinium groups on surface of solids. This method is divided in three steps: a fixation or "staining" step that ensures the dye is attached to the surface material by an N^+-dye complex formation, a washing step to remove unfixed dye, and a last step including addition of a volume of a release buffer, which is intended to displace the N^+-dye complex to release the dye molecules in solution.

Staining, washing and elution reagents were prepared as described previously (see ref 38 of the main paper). Briefly, CBB staining solution was prepared as 500 $mg.l^{-1}$ in 10% (v/v) methanol, 5% acetic acid and 85% ultrapure water (18.2 MΩ). The washing solution was made of 10% MeOH, 5% CH_3COOH and 85% H_2O without CBB. The elution buffer was prepared by mixing 250 ml of 0.25 M carbonate-bicarbonate buffer at pH 11.25 with 250 ml of MeOH.

ADECA method was performed after washing three times the glass slide with washing solution. The staining step was done by dipping $4cm^2$ of glass slide into the CBB staining solution during 5 min at room temperature. Free CBB was removed by five washings with washing solution. The number of washing steps was fixed when the measured absorbance was statistically identical from that of background measured on the native material. Then, surface was washed three times with ultrapure water. The elution step was performed by dipping the surface into the elution buffer. After gentle agitation, 250 µL of the eluted CBB solution was pipetted and transferred into a well of polystyrene plate (Maxisorp™, Nunc, France), wherein a volume of 20 µL of HCl (3 N) was previously introduced. The CBB acidified mixture was homogenized before optical density measurements. All spectrophotometric measurements were recorded with an Infinite 200™ absorbance microplate reader from Tecan having a wide measurement range up to 3.6 OD. Values are the mean of 3 independent measurements.

Density of peptide is calculated by substracting the absorbance obtained with glass slice coated in a solution containing peptides; to the absorbance obtained with TEOS thin film containing no peptide.

Sol used for glass coating	$TEOS/EtOH/H_2O/HCl$ 1/73/8.3/0.01	$TEOS/EtOH/H_2O/HCl$ peptide* H-Ahx-Arg-Arg-NH_2	$TEOS/EtOH/H_2O/HCl$ hybrid peptide* **2**
Number of complexation sites for CBB	0	3	2
Absorbance	0.0691	0.0730	0.3688
ADECA basic group density,$\times 10^{14}$ N^+cm^{-2}	Non appliable	0.192	5.301
Peptides/nm^2	Non appliable	0.09	2.65

*Peptide and hybrid peptide **2** were introduced at 5% molar related to TEOS