Supporting Information for

Highly loaded nanoparticles with Gentamicin Sulfate by combination of polyhydroxylated macromonomers and ROMP for the synthesis of bioactive biomaterials

Loïc Pichavant [a;b], Hélène Carrié [a;b], Marie-Christine Durrieu [b] and Valérie Héroguez [a]

[a] Université de Bordeaux, LCPO, UMR 5629, F-33600 Pessac, France. CNRS, LCPO, UMR 5629, F-33600 Pessac , France

[b] Université de Bordeaux, CBMN, UMR 5248, F-33600 Pessac, France ; CNRS, CBMN, UMR 5248, F-33600 Pessac France ; Bordeaux INP, CBMN, UMR 5248, F-33600 Pessac, France

CORRESPONDING AUTHOR Valérie Héroguez, Université de Bordeaux, LCPO, UMR 5629, F-33600 Pessac, France. CNRS, LCPO, UMR 5629, F-33600 Pessac , France

Tel: +33 (0) 5 40 00 22 28

Fax: +33 (0) 5 40 00 84 87

Email: heroguez@enscbp.fr

S1: ^{1}H NMR spectrum of ethoxylethyl glycidyl ether (2)

S2: ^{1}H NMR spectrum of poly(ethoxyethyl glycidyl ether) macromonomer (3)

S3: SEC traces of α-norbornenyl-poly(ethylene oxide)-*b*-polyglycidol based macromonomers (5), (6) and (7)

S4: ^{1}H NMR spectrum of the modified macromonomers (4) and (8)

S5: ^{1}H NMR spectrum of Gentamicin sulfate

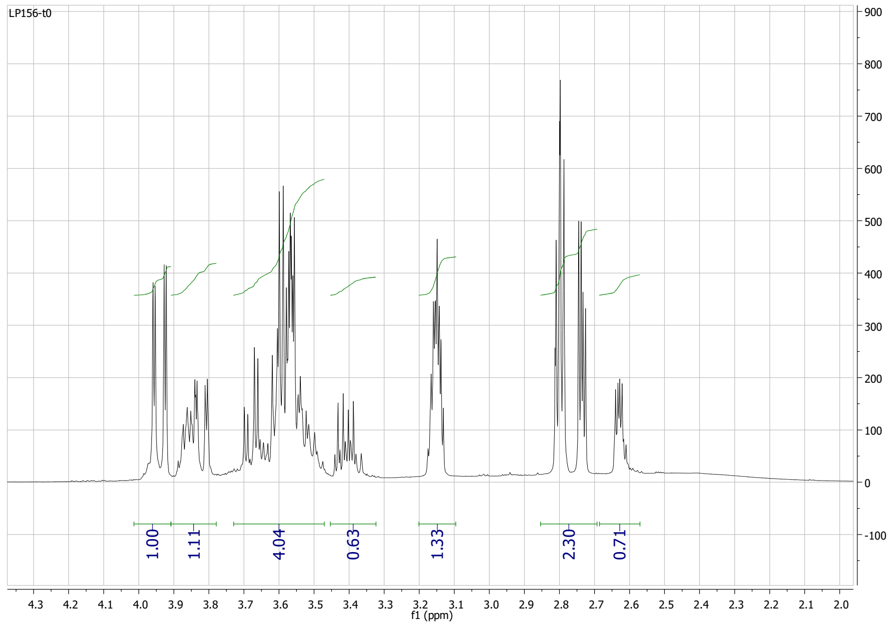
S6: ^{1}H NMR spectrum of the GS-modified macromonomer (10)

S7: Macromonomer conversion measurements

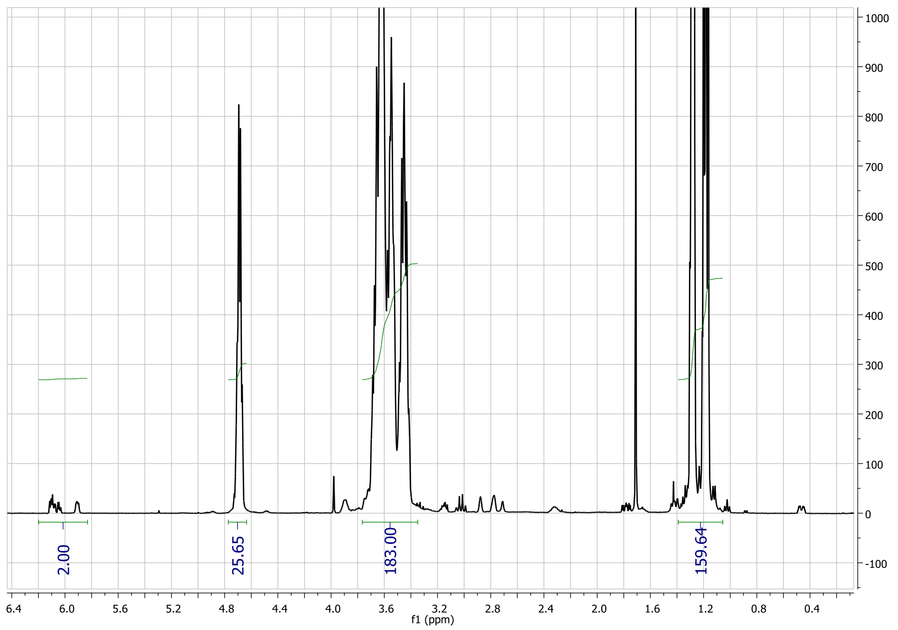
S8: Determination of the amount of GS per NPs

S9: FR-IR spectra of macromonomer (11) and nanoparticles NP6

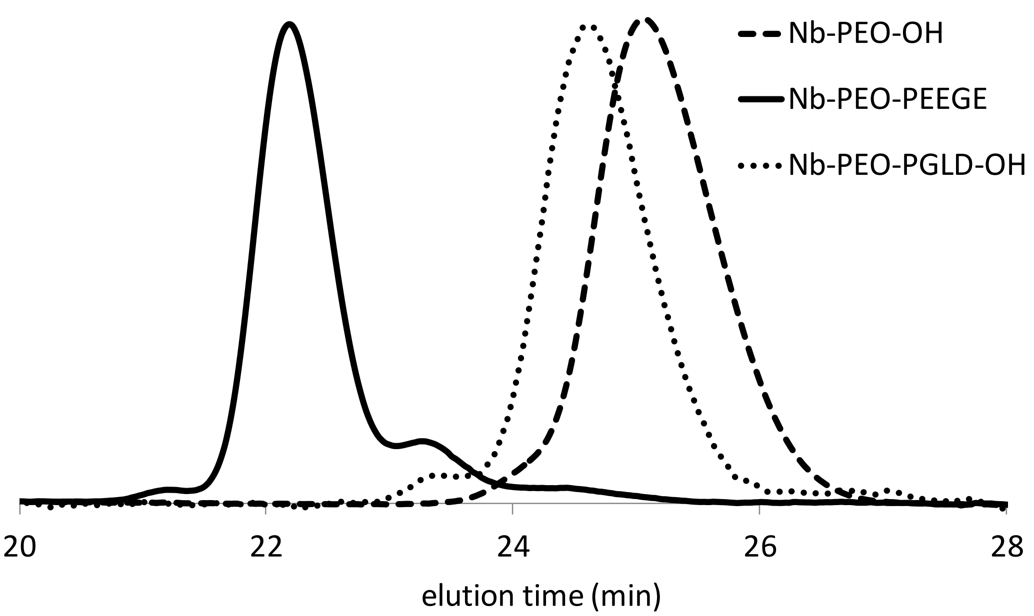
S1: ^{1}H NMR spectrum of ethoxylethyl glycidyl ether (2)



S2: ^{1}H NMR spectrum of poly(ethoxyethyl glycidyl ether) macromonomer (3)

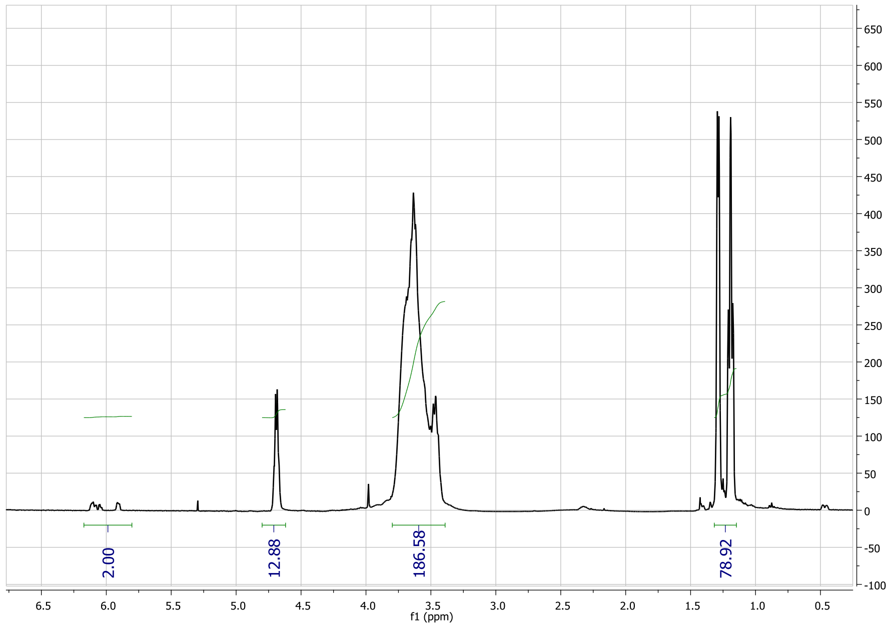


S3: SEC traces of α-norbornenyl-poly(ethylene oxide)-*b*-polyglycidol based macromonomers (5), (6) and (7)

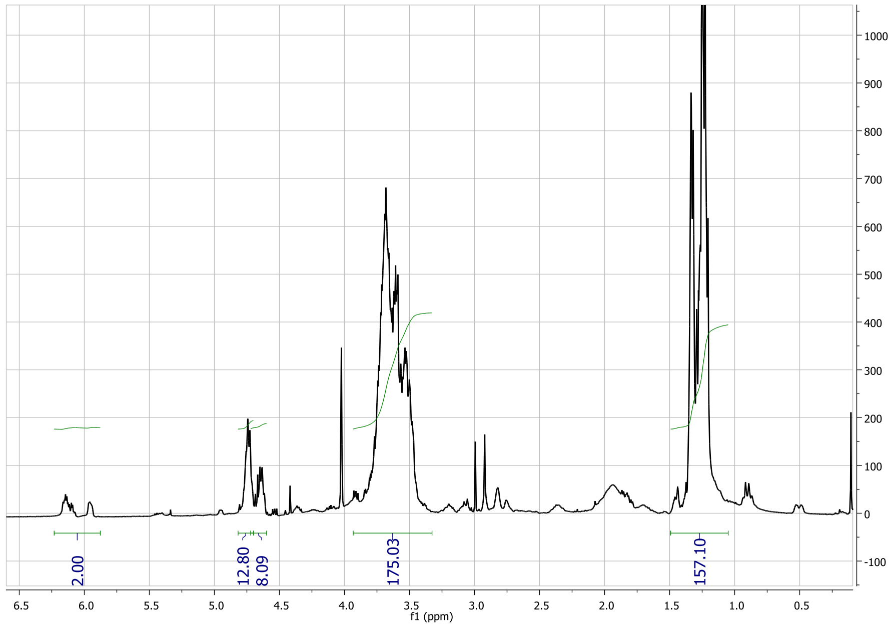


S4: ^{1}H NMR spectrum of the modified macromonomers (4) and (8)

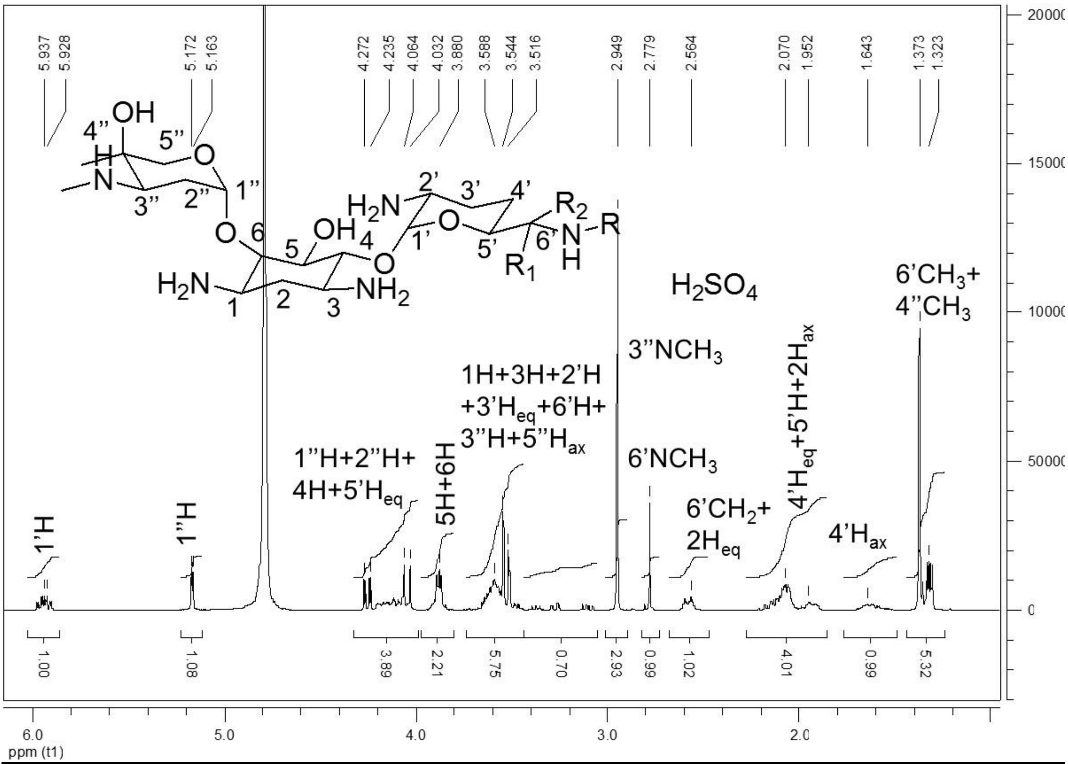
Macromonomer (4):



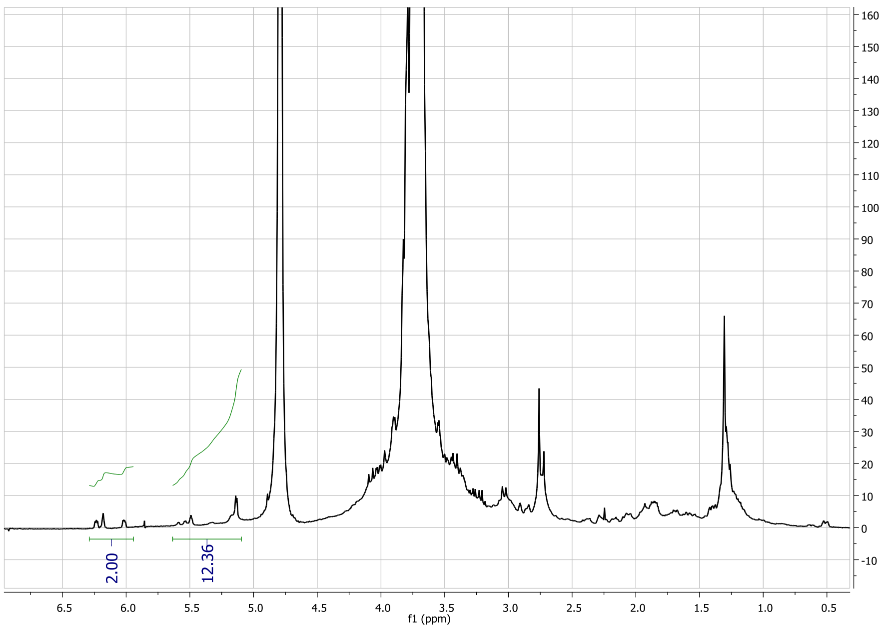
Macromonomer (8):



S5: ^{1}H NMR spectrum of Gentamicin sulfate



S6: ^{1}H NMR spectrum of the GS-modified macromonomer (10)



S7: Macromonomer conversion measurements

Macromonomer conversions were measured by gravimetric analyses. 1 mL of dispersion was first filtrated with a 0.1 µm PTFE filter, then the filtrate volume was measured (V_f), and finally this filtrate was evaporated under vacuum overnight in order to keep only the unreacted macromonomers. This residual macromonomers were weighed (m^f_{macro}) and compared to the initial mass. The macromonomer conversion can be calculated with the following equation:

$$\pi_{macro} = 1 - \frac{m^f_{macro}/V_f}{m^i_{macro}/V_i}$$

With,

- m^i_{macro} the initial weight of macromonomers introduced of the reaction

- V_i the initial volume

For this calculation, we approximated that the weight of the residual Grubbs catalyst is negligible.

S8: Determination of the amount of GS per NPs

Determination of the Gentamicin concentration in the latex:

The GS concentration in the latex can be calculated with the following equation:

$$C_{GS} = \frac{\pi \times 8 \times n_{Macro-GS} \times M_{GS}}{m_{Nb} + \pi(m_{Macro-GS} + m_{Macro-COOH})}$$

With:

- 8 is the amount of GS molecule linked on a macromonomer

- $n_{Macro-GS}$ the initial amount of macromonomer functionalized with GS

- M_{GS} the molecular weight of Gentamicin

- m_i the initial weight of compound i

- π the conversion of the macromonomers

For this calculation, we assumed that the macromonomers are consumed at the same time regardless the functionalization

NPs	NP3	NP4	NP5	NP6
C_{GS} (mg/g)	245	149	115	182

Determination of the GS amount per NPs:

Knowing the GS concentration in the latex and the volume of an NPs we can approximate the GS amount per NPs:

$$N_{GS/NP} = \frac{C_{GS} \times \rho_{NP} \times V_{NP} \times N_A}{M_{GS}}$$

with:

- C_{GS}: Gentamicin concentration in the latex (in mg/g)

- ρ_{NP}: latex density approximated to equal to 1 g/mL

- V_{NP}: volume of a NP ($V_{NP}=\pi D_{NP}^3/6$)

- N_A: Avogadro number

- M_{GS}: molecular weight of Gentamicin

NPs	NP3	NP4	NP5	NP6
N_{GS}/NP	38 10^6	14 10^6	2.4 10^6	32 10^6

S9: FR-IR spectra of macromonomer (11) and nanoparticles NP6