

Figure S1: Far UV (a) and Near UV (b) CD spectra of P5 peptide recorded respectively at 0.01% w/v and 0.1% w/v.

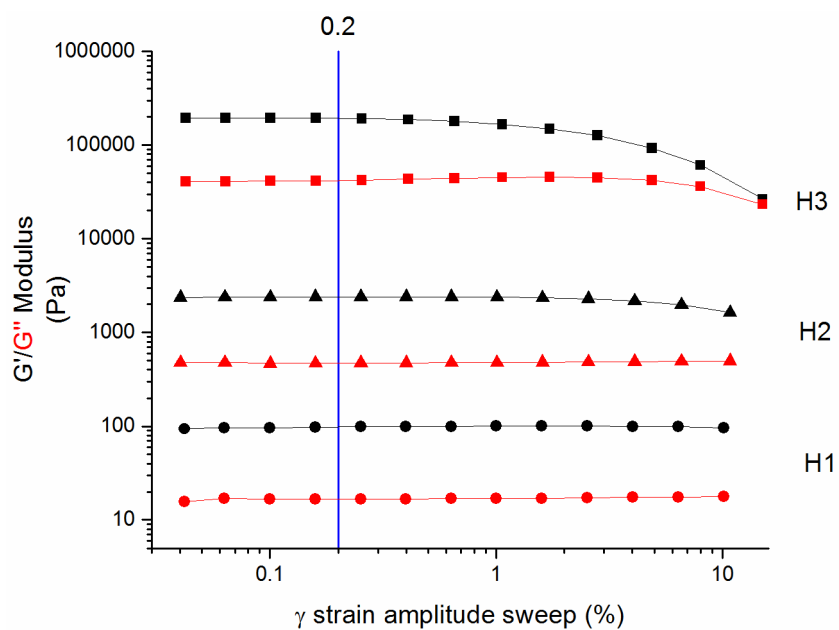


Figure S2: Strain amplitude sweep ( $\gamma = 0.04\text{--}14\%$ ) at constant angular frequency ( $\omega = 1 \text{ rad s}^{-1}$ ) on H1, H2 and H3 hydrogels are shown to identify the linear viscoelastic region (LVR).

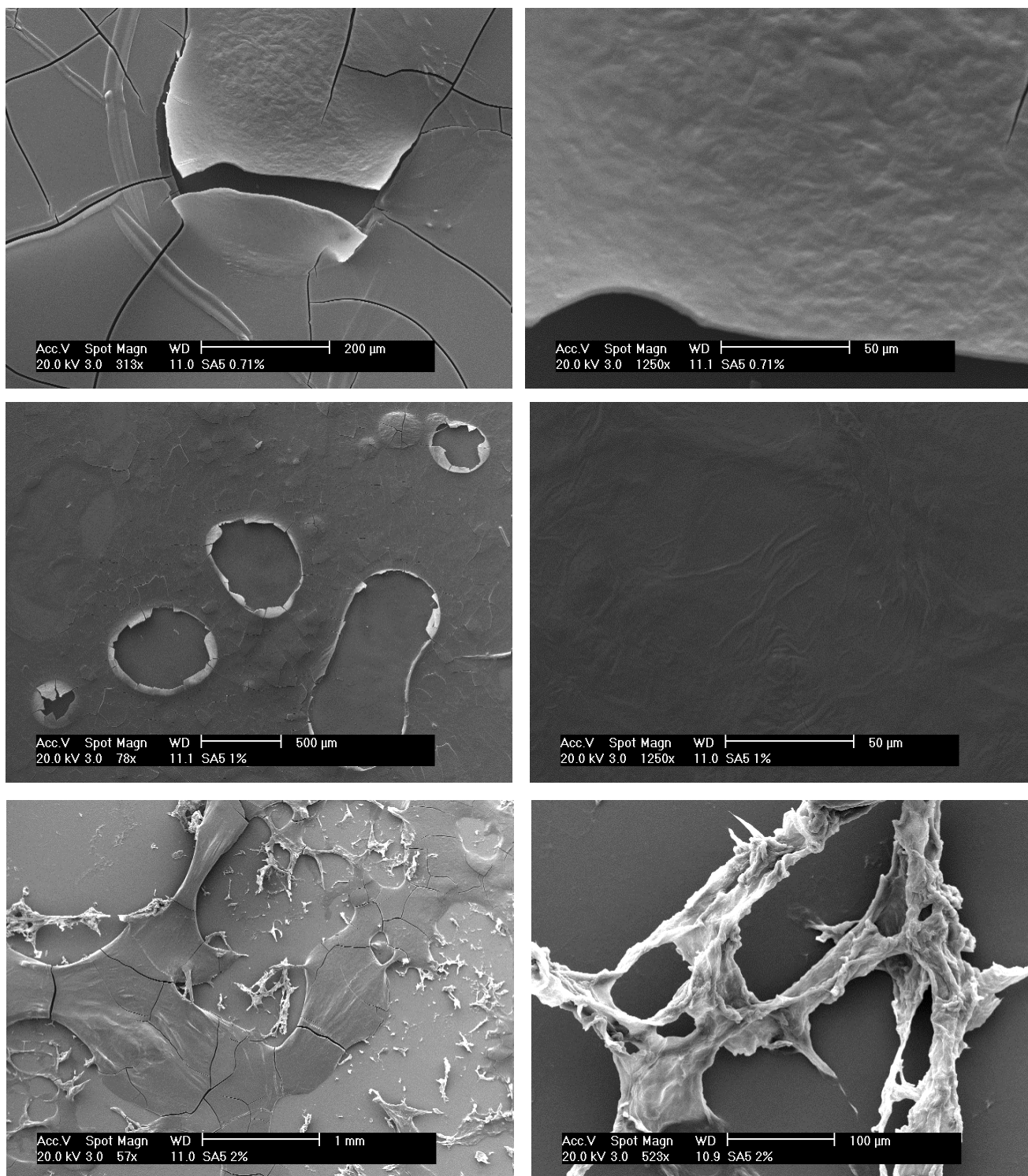


Figure S3: SEM images of H1 (first row) H2 (second row) and H3 (third row) hydrogels acquired after freeze drying of the hydrogels on the silicon substrate.

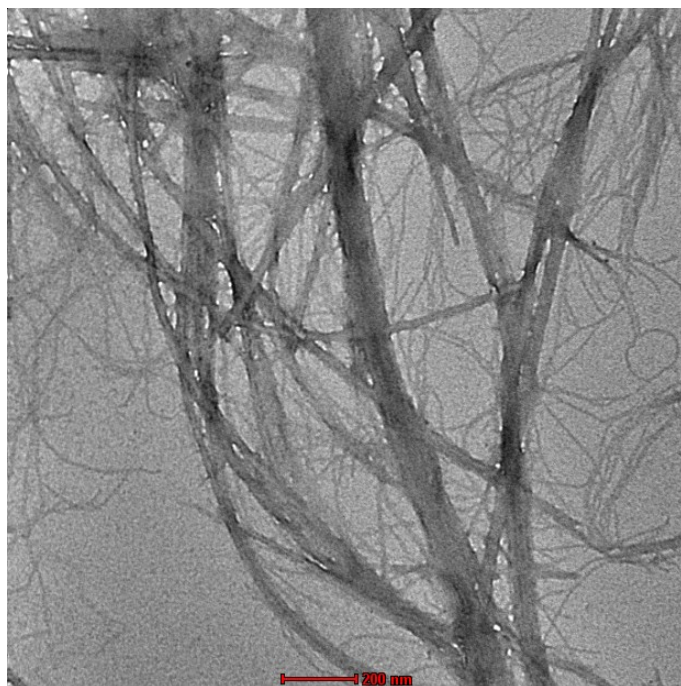


Figure S4: TEM image of H3 hydrogel (2 wt% P5).

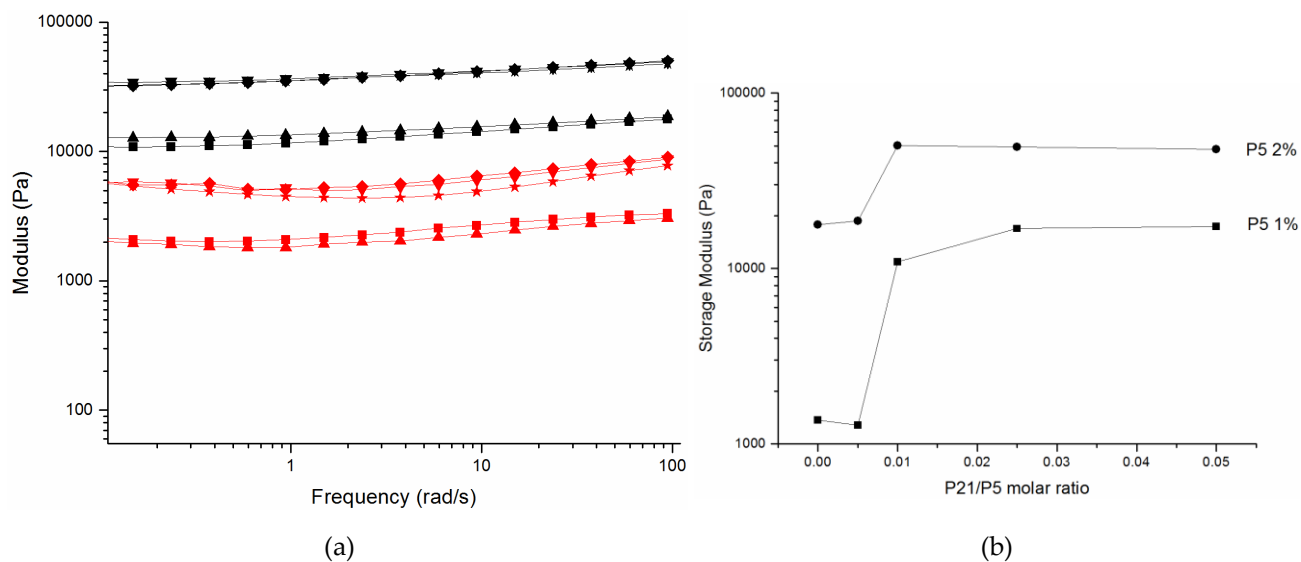


Figure S5: Rheology of hydrogels of P5 2% (w/v) with different concentration of P21. (a) Dynamic frequency sweep at 0.2% of strain of H3(■), H8 (▲),H9 (◆), H10 (▼)and H11 (★) hydrogels. Black symbols report storage moduli ( $G'$ ), while red symbols report loss moduli ( $G''$ ); (b) Storage modulus ( $G'$ ) of hydrogel at 1% (●) and 2% (■) of P5 as a function of concentration of P21 peptide recorded at 0.2 % strain and 9.4 rad s<sup>-1</sup>.

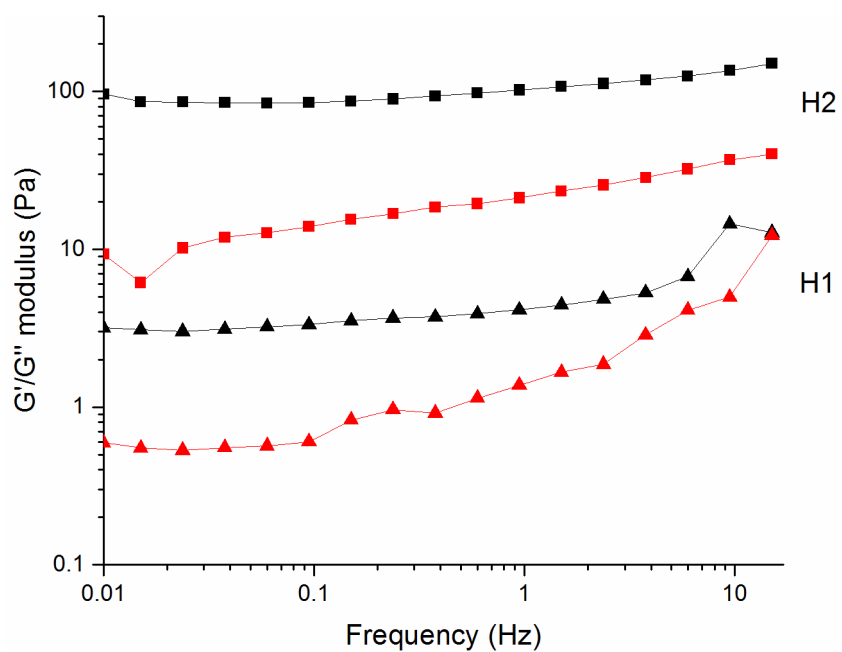


Figure S6: Dynamic frequency sweep at 0.2% of strain of H1(▲), H2 (■) hydrogels formed in 10% AcOH. Black symbols report storage moduli ( $G'$ ), while red symbols report loss moduli ( $G''$ ).

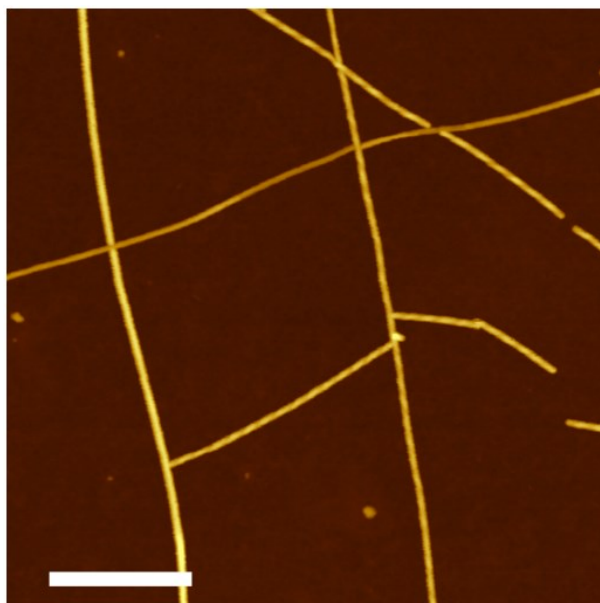
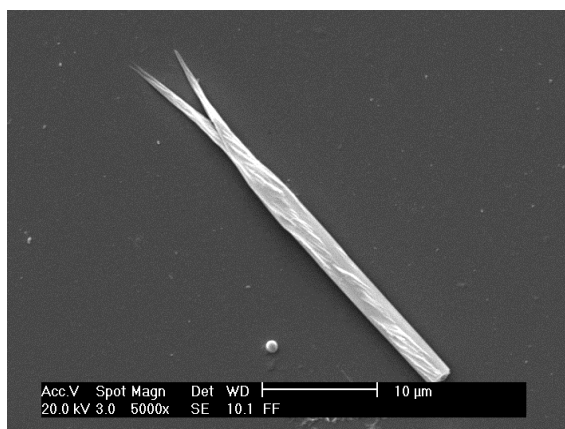


Figure S7: AFM image of hydrogel formed by 1 wt% P5 in 10% (m/v) AcOH . The bar represents 500 nm.

a)



b)

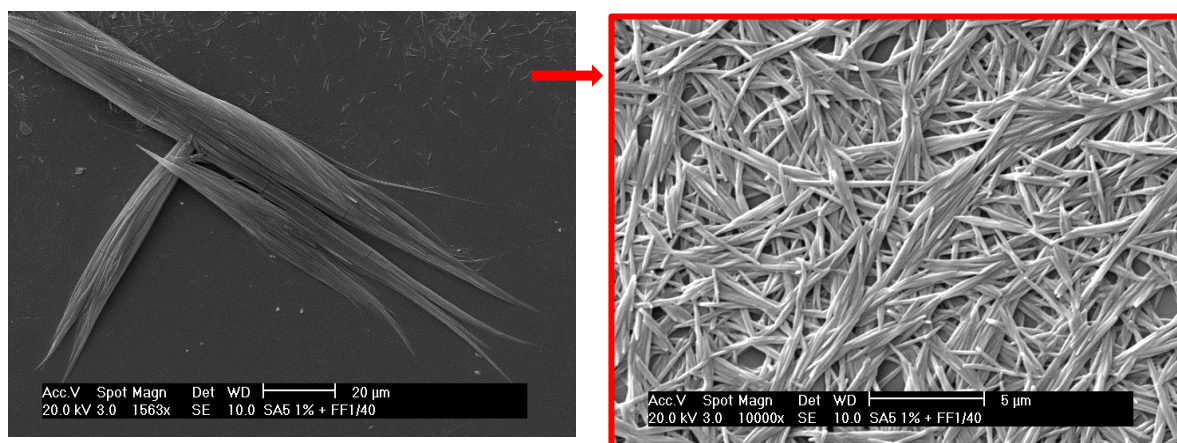
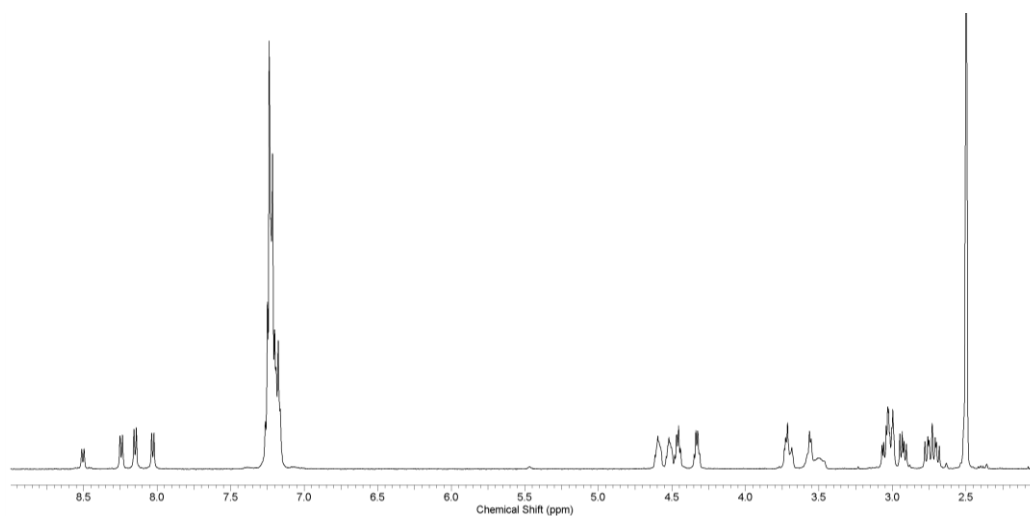


Figure S8: SEM images of a) FF nanotubes formed by following the protocol of Song et al. [34]; b) HF4 hydrogel formed by P5 at 1% (m/v) and FF at 0.25% (m/v); on the right the region indicated by the red arrow at higher magnification.

a)



b)

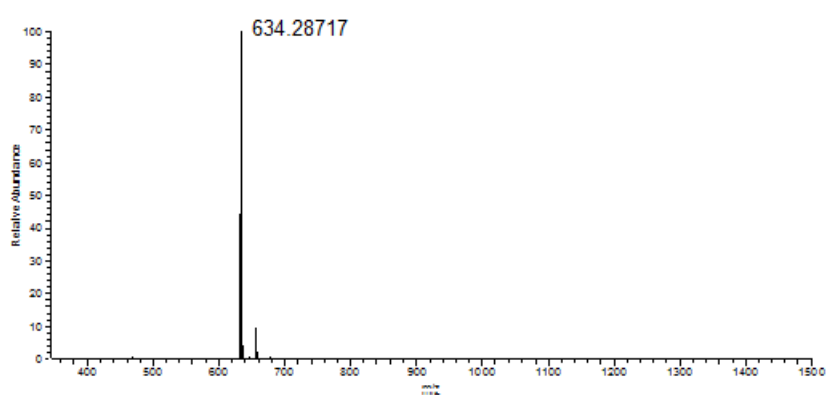
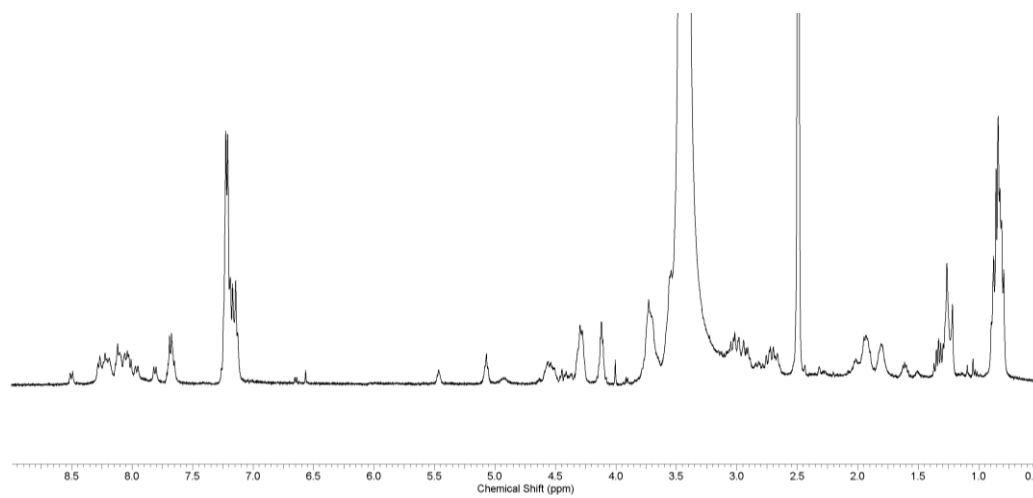


Figure S9: a)  $^1\text{H}$ -NMR spectrum of P5 recorded in  $\text{dms0-d}_6$  at 298K; b) HRESI-MS spectrum of P5.

a)



b)

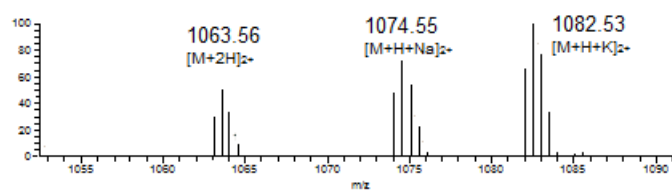
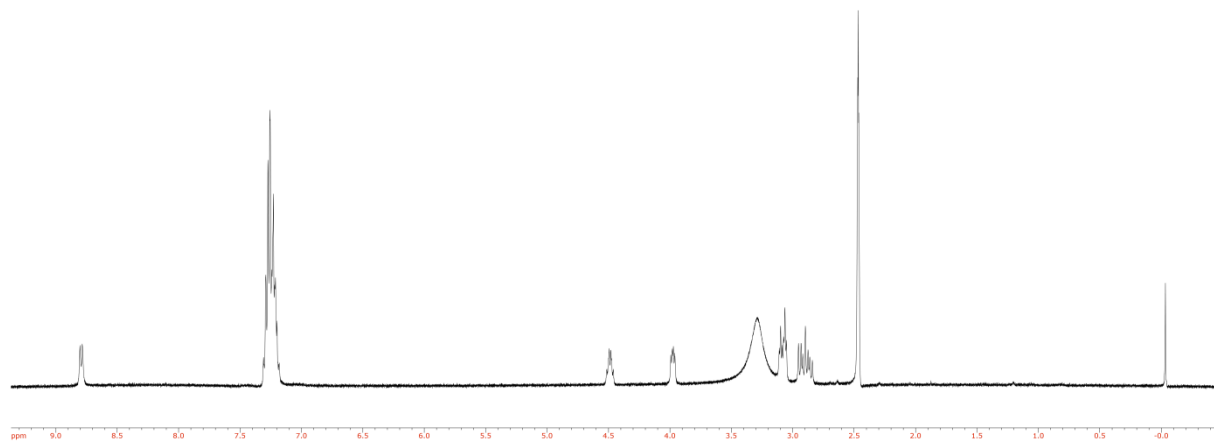


Figure S10: a)  $^1\text{H}$ -NMR spectrum of P21 recorded in  $\text{dms0-d}_6$  at 298K; b) ESI-MS spectrum of P21.

a)



b)

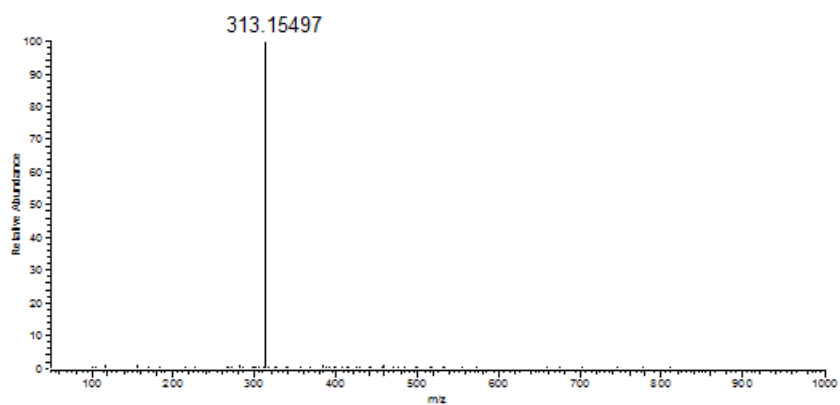


Figure S11: a)  $^1\text{H}$ -NMR spectrum of FF recorded in  $\text{dms0-d}_6$  at 298K; b) ESI-MS spectrum of FF.