Supporting information

Wet spinning and radial self-assembly of a carbohydrate low molecular weight gelator into well organized hydrogel filaments

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SI-1 Velocity of the jet

Flow rate	5 µl/min			10 µl/min		
Replicate n°	**1**	**2**	**3**	**1**	**2**	**3**
Measured jet diameter (mm)	0.168	0.176	0.185	0.146	0.184	0.222
Measured jet velocity (mm/s)	8.6 ± 0.5	8.3 ± 0.5	8.1 ± 0.4	10.5 ± 0.4	10.4 ± 0.5	11.1 ± 0.8
Predicted jet velocity (mm/s)	3.8 ± 0.9	3.4 ± 0.8	3.1 ± 0.7	10 ± 3	6 ± 1	4.3 ± 0.8

***Table SI-1**: velocity of the jet in different conditions*

SI-2- Fiber width distribution: comparison between bulk and wet spun hydrogels

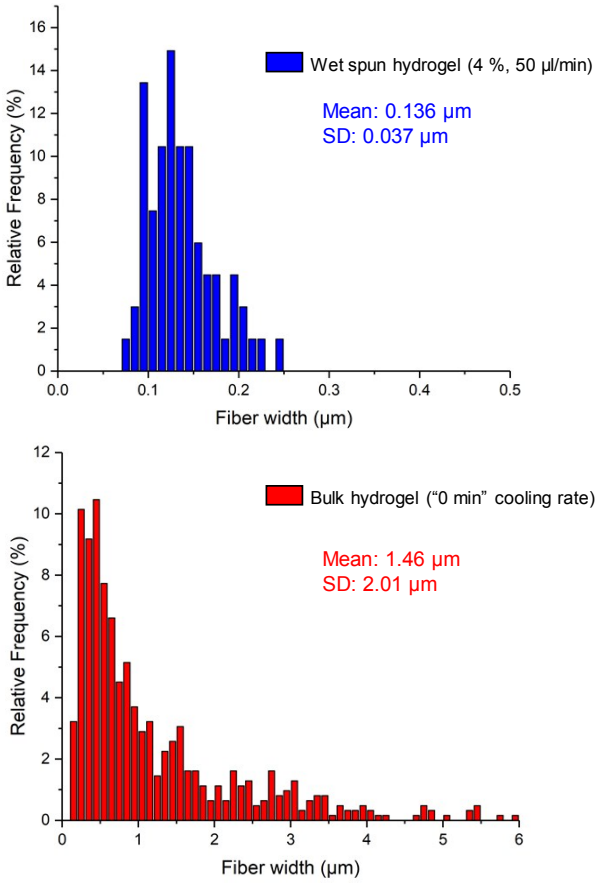


***Figure SI-2:** Fiber width distribution: comparison between wet spun (top) and bulk (bottom) hydrogels*

SI-3- Thermogravimetric analysis (TGA)

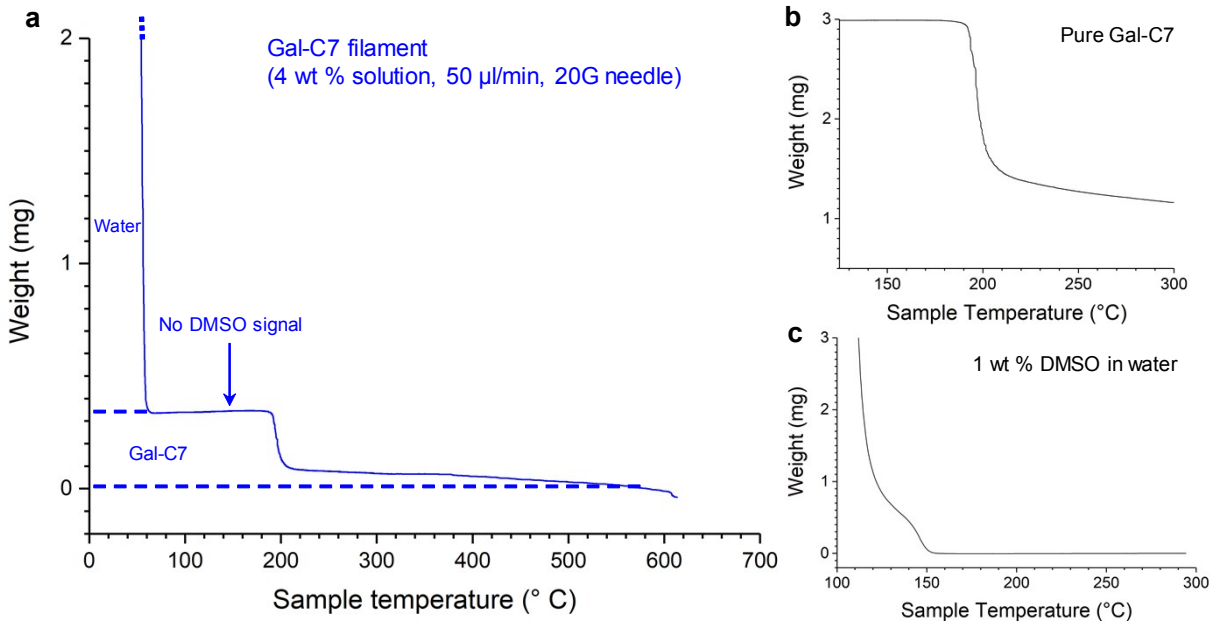


Figure SI-3: *(a) Magnification on the thermogram of a wet-spun Gal-C7 filament. The arrow indicates the temperature expected for the DMSO transition. (b) Magnification of the first transition of pure Gal-C7. (c) Magnification of the thermogram of a solution of water containing 1 wt % of DMSO.*

SI-4- Lifetime of the filaments

Flow rate	**25 µl/min**		**50 µl/min**	
Conditions	**Lifetime exposed to air (days)**	**Lifetime under cover slip (days)**	**Lifetime exposed to air (days)**	**Lifetime under cover slip (days)**
Water (RT)	3	5	2	3
DMEM (RT)	> 31	> 31	> 34	> 34
DMEM (37 °C)	7	4	< 1	4
PBS (RT)	< 1	3	<1	2

Table SI-4*: Lifetime of the filaments in different conditions*

SI-5- Small Angle X-Ray Scattering (SAXS)

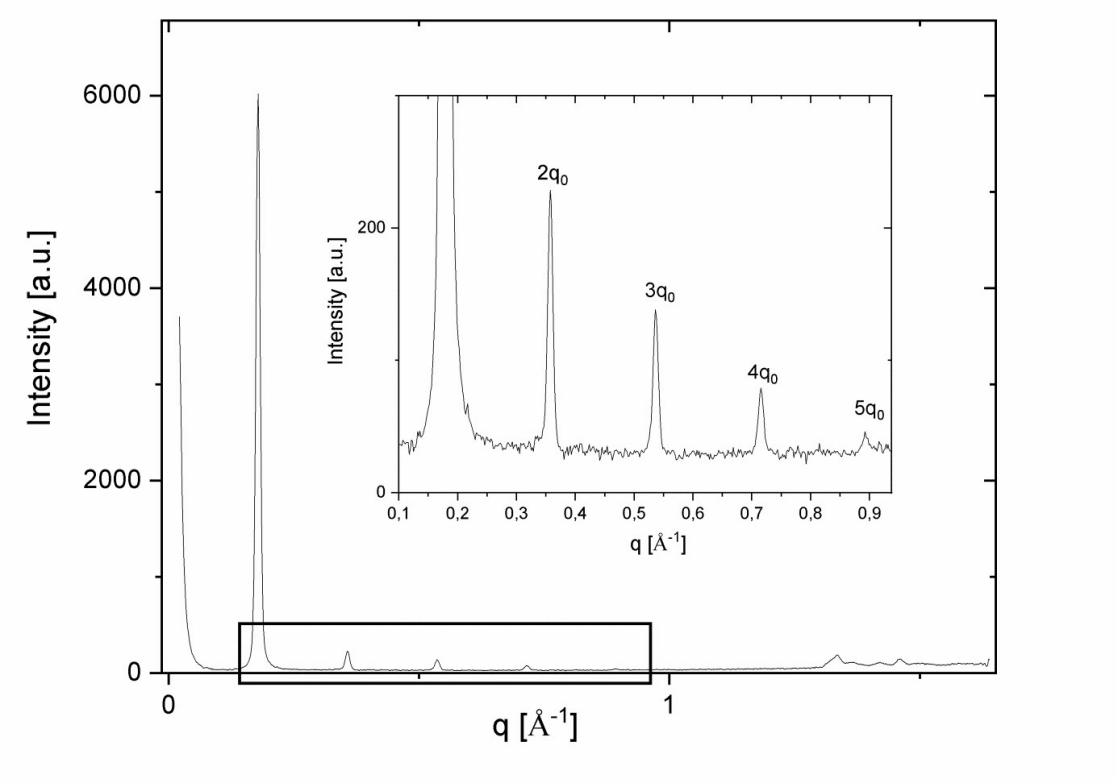


***Figure SI-5a**. SAXS intensity as a function of the scattering vector of the fresh wet-spun Gal-C7 gel*

The SAXS curve for the wet-pun gel is reported in Figure SI-5a. The main feature is the presence of a strong scattering peak followed by four less intense ones at positions $2q_0$, $3q_0$, $4q_0$ and $5q_0$, indicative of a well defined lamellar organization. From the position of the first order peak (q_0*=0.179 Å^{-1}) we can calculate the long period spacing of the lamellar structure, d=35.1 Å. The fiber width estimated from SAXS spectrum is 60 nm from the peak width (ref). Besides, the low q region of the curve presents a power law trend, $I(q) \alpha q^{-4}$, which corresponds to the Porod region for the sharp interface of the fibers observed in cryo-SEM images.

Sample	**q_0 [Å^{-1}]**	**[Å]**
Fresh wet-spun gel threads	0.179	35.1
Crystals	0.204	30.5
Gel prepared by slow cooling of an aqueous solution	0.178 and 0.164	35.2 and 38.3

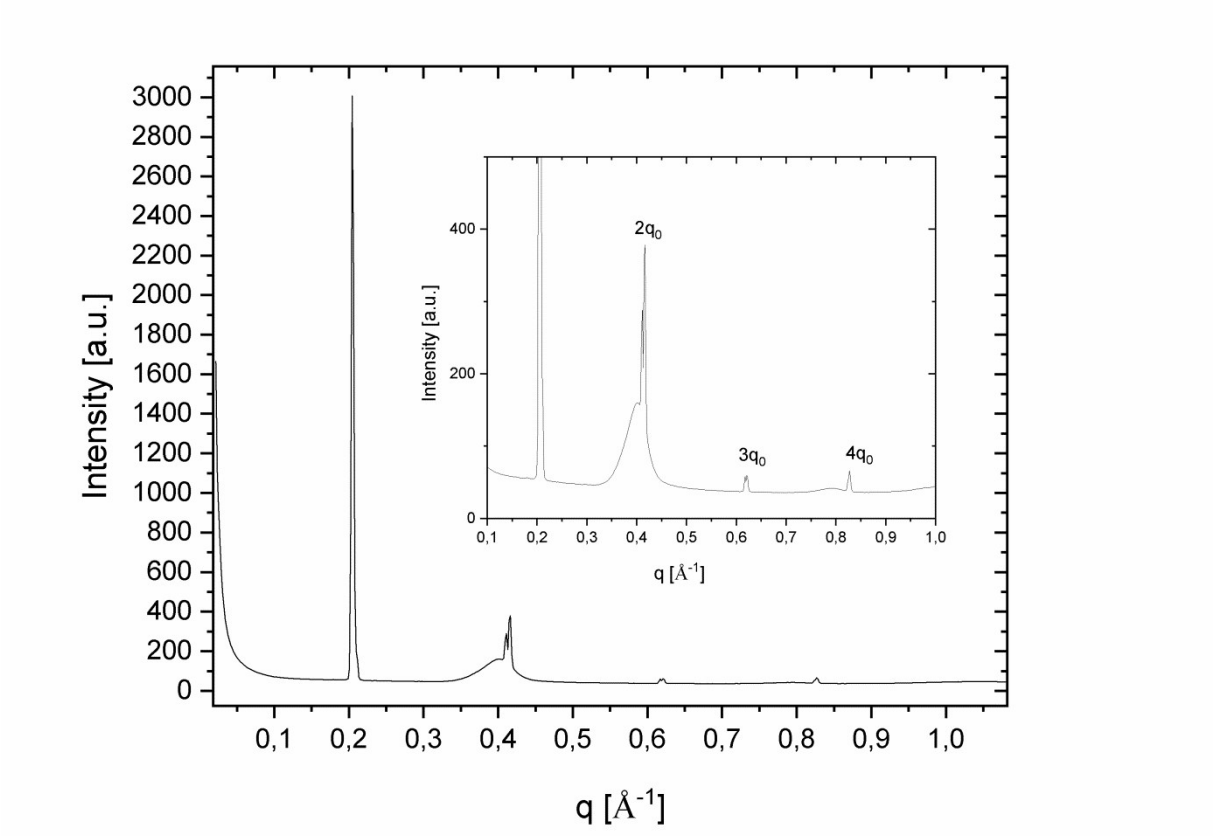


***Figure SI-5b**. SAXS intensity as a function of the scattering vector of the Gal-C7 crystals.*

The obtained crystals were recovered and analysed by SAXS and the corresponding spectrum is reported in Figure SI-5b. The SAXS region looks very similar to that of the wet-spun filament, a lamellar order is recognized with a 30.5 Å spacing (peak position, 0.204 Å^{-1}).

SI-6- Wide Angle X-Ray Scattering (WAXS)

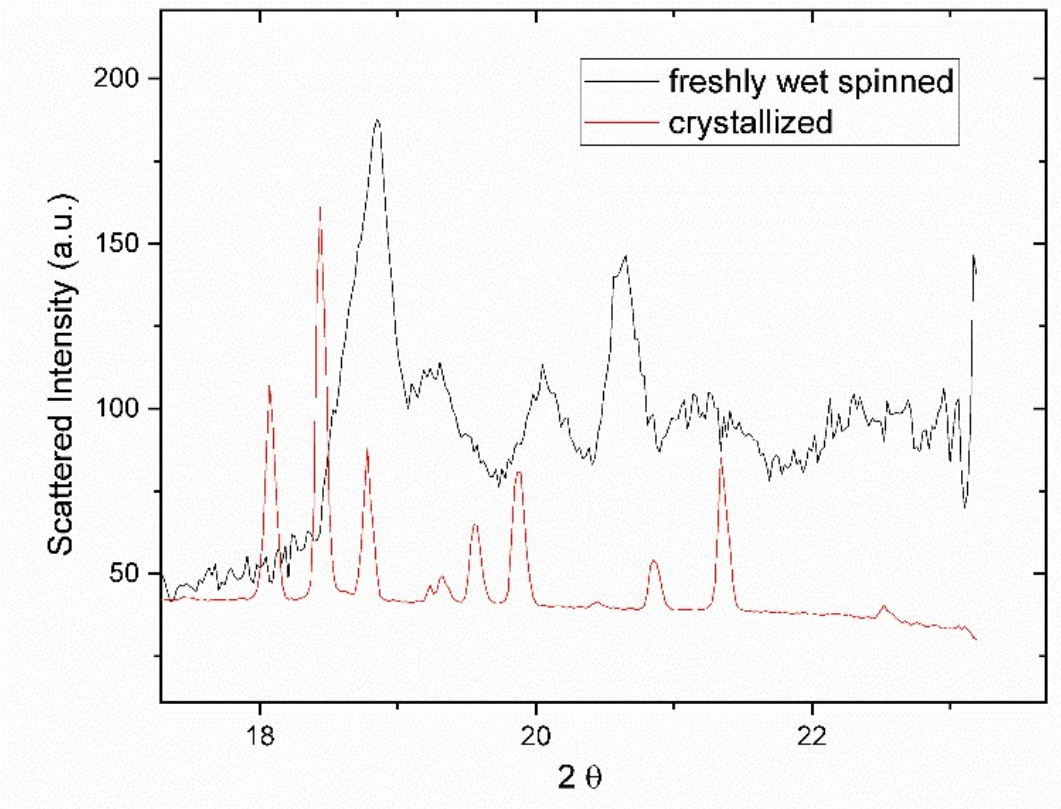


Figure SI-6. *WAXS intensity as a function of the scattering vector of the crystallized and freshly wet-spun Gal-C7.*

SI-7- X-Ray diffraction

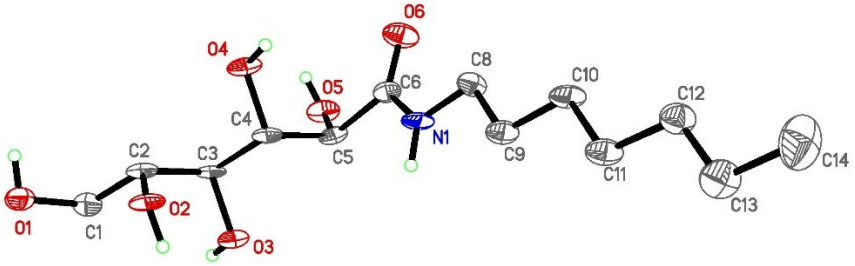


Figure SI-7a *: Molecular view of Gal-C7 in the crystal. Thermal ellipsoids represent 50% probability level. H atoms (except for that on O and N atoms) are omitted for clarity.*

D-H...A	d(D-H)	d(H...A)	d(D...A)	<(DHA)
O(1)-H(1)...O(1)#1	0.85(8)	2.05(8)	2.894(5)	170(8)
O(2)-H(2)...O(4)#2	0.89(9)	2.00(8)	2.738(7)	139(7)
O(3)-H(3)...O(2)#3	0.83(9)	1.90(9)	2.722(7)	167(9)
O(4)-H(4)...O(5)#4	0.86(8)	1.85(8)	2.700(7)	171(8)
O(5)-H(5)...O(3)#5	0.78(8)	2.07(8)	2.760(7)	147(8)
N(1)-H(1N)...O(6)#2	0.89(7)	2.06(7)	2.943(7)	172(6)

Symmetry transformations used to generate equivalent atoms:

#1 -x+2,y-1/2,-z+1 #2 x,y+1,z #3 x+1,y,z

#4 x-1,y,z #5 x,y-1,z

Table SI-7*. Hydrogen bonds for Gal-C7 in the crystal [Å and °].*

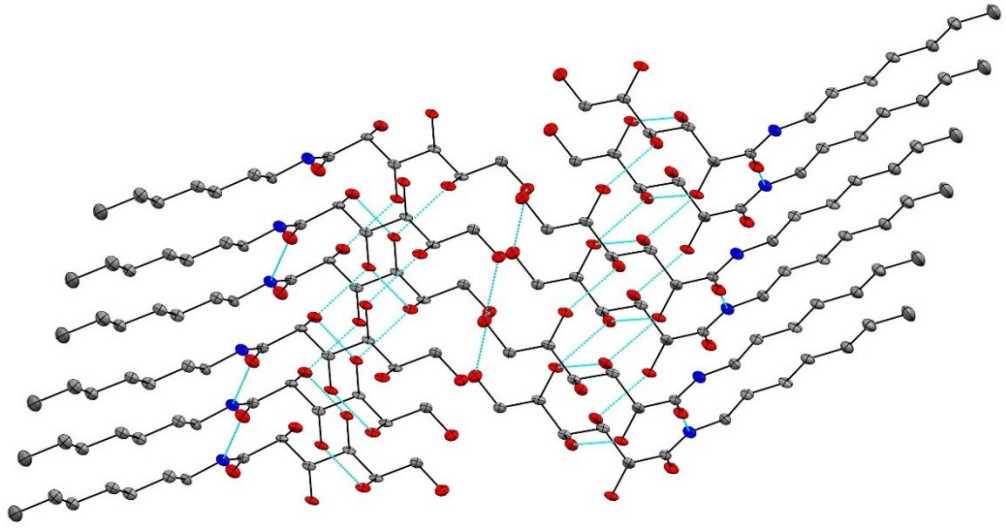
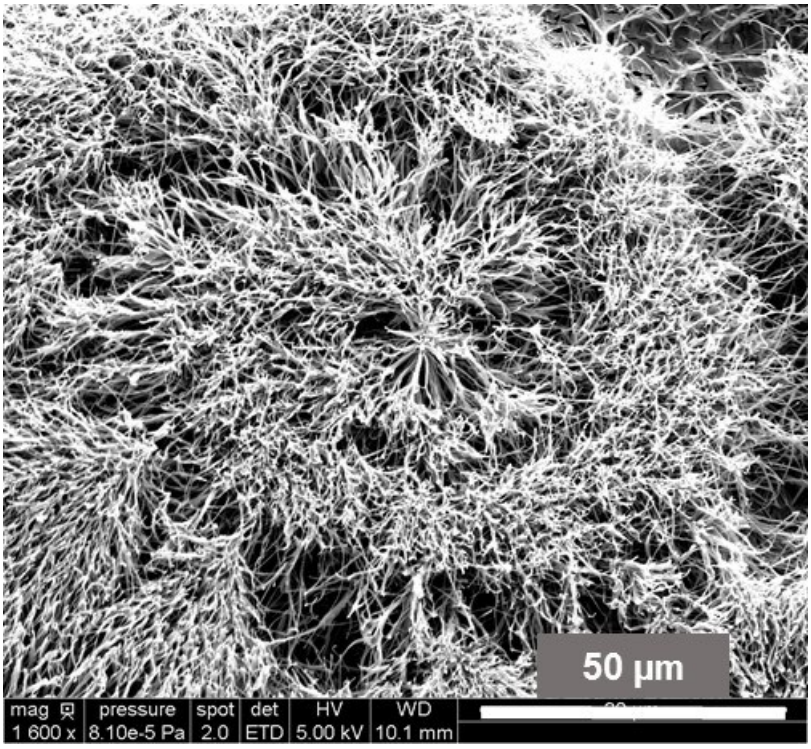


Figure SI-7b*: Representative O-H---O and N-H---O bonds are drawn as dotted lines (H atoms are omitted for clarity).*

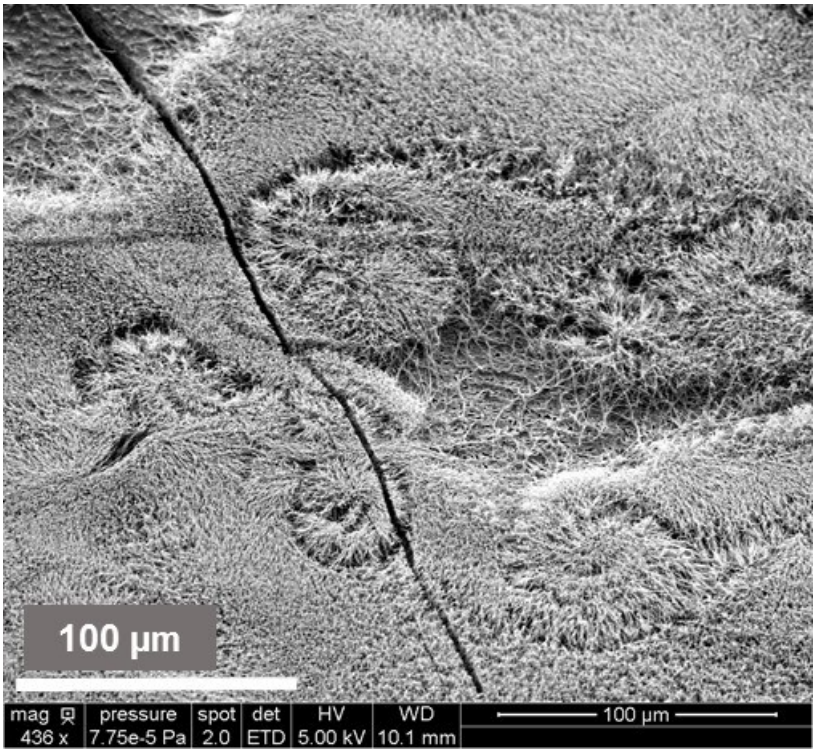
SI-8- Cryo-Scanning Electronic Microscopy – Extra images

Spirals in filaments produced with a 5wt% solution at 100 µL/min

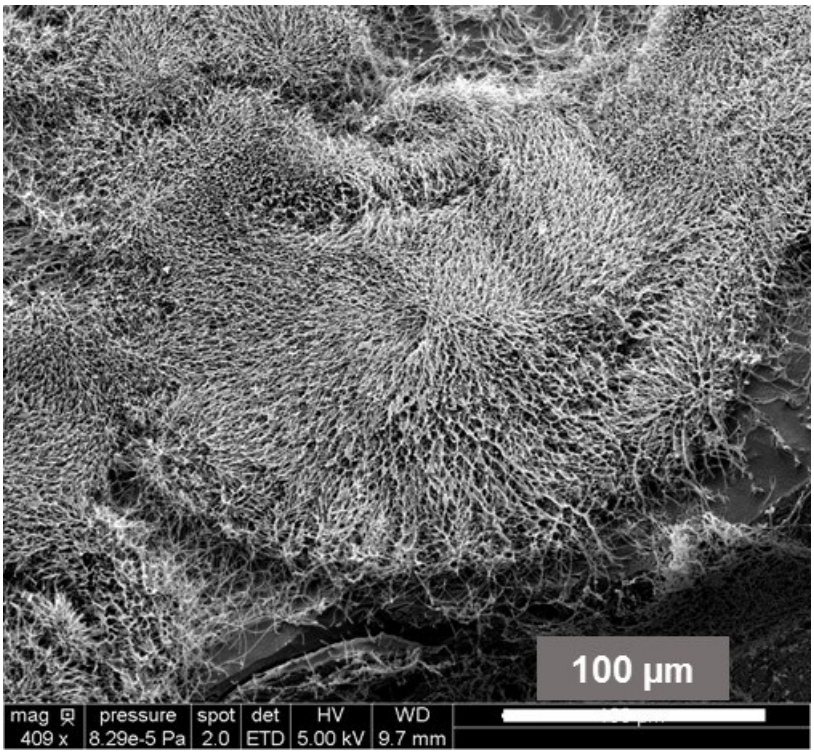
Enlargement of Figure 7e



Other spirals



Radial organization, 5wt%, 100µL/min



Radial organization, 5wt%, 50µL/min