Table S1. Model parameters

Parameter	*Description*	*Value*	*Unit*
GEOMETRY DIMENSIONS			
Spacer fibers			
l	Length of each fiber	3119	μm
l_S^1	Uniform thickness component (small fiber)	10.2	μm
l_S^2	Bézier curve component (small fiber)	700	μm
l_S^3	Bézier curve component (small fiber)	2100	μm
d_S^1	Diameter thicking (small fiber)	490	μm
d_S^2	Diameter thinning (small fiber)	250	μm
l_L^1	Uniform thickness component (large fiber)	700	μm
l_L^2	Bézier curve component (large fiber)	2300	μm
l_L^3	Bézier curve component (large fiber)	3100	μm
d_L^1	Diameter thicking (large fiber)	520	μm
d_L^2	Diameter thinning (large fiber)	300	μm
Channel size			
L_x	Length of the computational domain	4411	μm
L_y	Width of the computational domain	4411	μm
L_z	Height of the computational domain	800	μm
COMPUTATIONAL MODEL			
Navier-Stokes parameters			
$u_{in,avg}^{set}$	Average cross-flow velocity	0.14	$m \cdot s^{-1}$
ρ	Liquid density	998	$kg \cdot m^{-3}$
η	Liquid dynamic viscosity	$1 \cdot 10^{-3}$	$Pa \cdot s$
L_P	Membrane permeability	$2.45 \cdot 10^{-11}$	$m \cdot Pa^{-1} \cdot s^{-1}$
Δp	Trans-membrane pressure	400	kPa
Particle trajectories			
d_{att}	Maximum distance from wall that results in deposition	5	μm
N_P	Number of particles - for diamond orientation	200000	particles
	- for ladder orientation	283000	
Δt	Time step for trajectory and deposition calculation	10^{-5}	s