Electronic Supplementary Material (ESI) for Lab on a Chip.

Supporting information

for

Goodbye fouling: Two-photon polymerization enables unique coaxial lamination mixer (CLM) for stable production of monodisperse drug carrier nanoparticles

Peer Erfle[a,c,*,1], Juliane Riewe[b,c,1], Heike Bunjes[b,c], Andreas Dietzel[a,c,*]

[a] Technische Universität Braunschweig, Institut für Mikrotechnik, Alte Salzdahlumer Str. 203, 38124 Braunschweig, Germany

[b] Technische Universität Braunschweig, Institut für Pharmazeutische Technologie und Biopharmazie, Mendelssohnstr. 1, 38106 Braunschweig

[c] Technische Universität Braunschweig, Zentrum für Pharmaverfahrenstechnik – PVZ, Franz-Liszt-Str. 35a, 38106 Braunschweig, Germany

* Corresponding authors, e-mail addresses: p.erfle@tu-braunschweig.de, a.dietzel@tu-braunschweig.de

Table S1: Measured mixing time of the iodine solution with sodium thiosulfate solution along the flow rate ratio of the organic phase to total flow rate. Four different channel systems were used: The first system contained only the nozzle injection while the other systems additionally contained one, two and three stretch and fold elements. The relative decrease of the mixing time from one channel system to the next channel system were calculated.

Flow ratio of organic phase to total liquid flow rate	**Minimum required flow rate $\left[\frac{\mu l}{min}\right]$ / Mixing time $[ms]$**				**Relative decrease of the mixing time**		
	Only nozzle injection	**1 Element**	**2 Elements**	**3 Elements**	**1 Element / Nozzle**	**2 Elements / 1 Element**	**3 Elements / 2 Elements**
5%	19 / 714	120 / 97	180 / 62	250 / 43	86%	36%	30%
10%	8 / 1696	50 / 232	80 / 139	110 / 98	86%	40%	30%
15%	3 / 4524	20 / 581	33 / 337	50 / 215	87%	42%	36%
20%	1 / 13570	10 / 1161	18 / 618	30 / 358	91%	47%	42%
Average cross-sectional area* $[10^{-8}\,m]$	3.142	2.688	2.573	2.488	**Average**		
Distance nozzle - outlet $[10^{-3}\,m]$	7.2				88%	41%	35%

* The average cross-sectional area varies between the systems with different amounts of elements. The cross-sectional area is determined by the volume of the channel and the distance between the nozzle and the observation point near the outlet.

Table S2: Short-term stability of castor oil nanodispersions loaded with fenofibrate or cannabidiol.

Time after preparation in days	**z-average diameter / polydispersity index**		
	5 mg/mL castor oil in ethanol	10 mg/mL castor oil in ethanol	20 mg/mL castor oil in ethanol
Castor oil nanoparticles loaded with 3 % fenofibrate			
0	74 nm / 0.06	99 nm / 0.07	137 nm / 0.10
6	73 nm / 0.06	98 nm / 0.07	136 nm / 0.09
21	73 nm / 0.06	99 nm / 0.06	136 nm / 0.09
Castor oil nanoparticles loaded with 10 % cannabidiol			
0	78 nm / 0.06	95 nm / 0.06	133 nm / 0.09
2	78 nm / 0.05	95 nm / 0.07	134 nm / 0.09
14	77 nm / 0.06	95 nm / 0.07	134 nm / 0.08
22	77 nm / 0.05	95 nm / 0.06	133 nm / 0.08