Electronic Supplementary Information (ESI) for:

Tailored nanotopography of photocurable composites for control of cell migration

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1 Analysis statistics of investigated samples

Table S1 Statistical values regarding the cell migration measurements for all investigated sample variations

Sample name	Number of cells	Analysed videos	Total data points	Data points of moving cells	Mean trajectory length (min)	Min. trajectory length (min)	Max. trajectory lenght (min)
OC-I	103	4	38871	34381	51	14	90
52-20	133	8	69793	52206	69	14	90
165-5	163	8	61819	45929	51	13	60
165-10	138	8	54055	42087	52	14	60
165-20	103	6	44117	29607	56	20	60
421-20	113	6	59558	48452	70	18	90

2 Cells classified as non-migrating

The finding that nanorough surfaces hinder cell migration is supported by the fact that the ratio of time-points of cells classified as non-migrating is higher on nanorough surfaces (19 % (421-20) up to 33 % (165-20)) compared to the smooth polymer reference (12 % (OC-I)) (Table S2).

Table S2 Fraction of total measured time points with cells classified as non-migrating for all investigated samples. The cut-off length was set to 5 µm, meaning the cell does not move more than 5 µm relative to their starting position during the whole observed time period.

Sample name	Non-moving cells (%)
OC-I	12
52-20	25
165-20	33
421-20	19
165-5	26
165-10	22
165-20	33

3 Relative number of particles inside prepared composites

Table S3 Theoretical number of particles per volume unit for all fabricated composites relative to 421-20, which contains the largest particles.

Sample name	Volume of a single particle (μm^3)	Number of particles compared to composite 421-20
52-20	0.00007	531
165-5	0.00235	4
165-10	0.00235	8
165-20	0.00235	17
421-20	0.03907	1

4 Detailed distributions of alpha exponent and instantaneous velocity

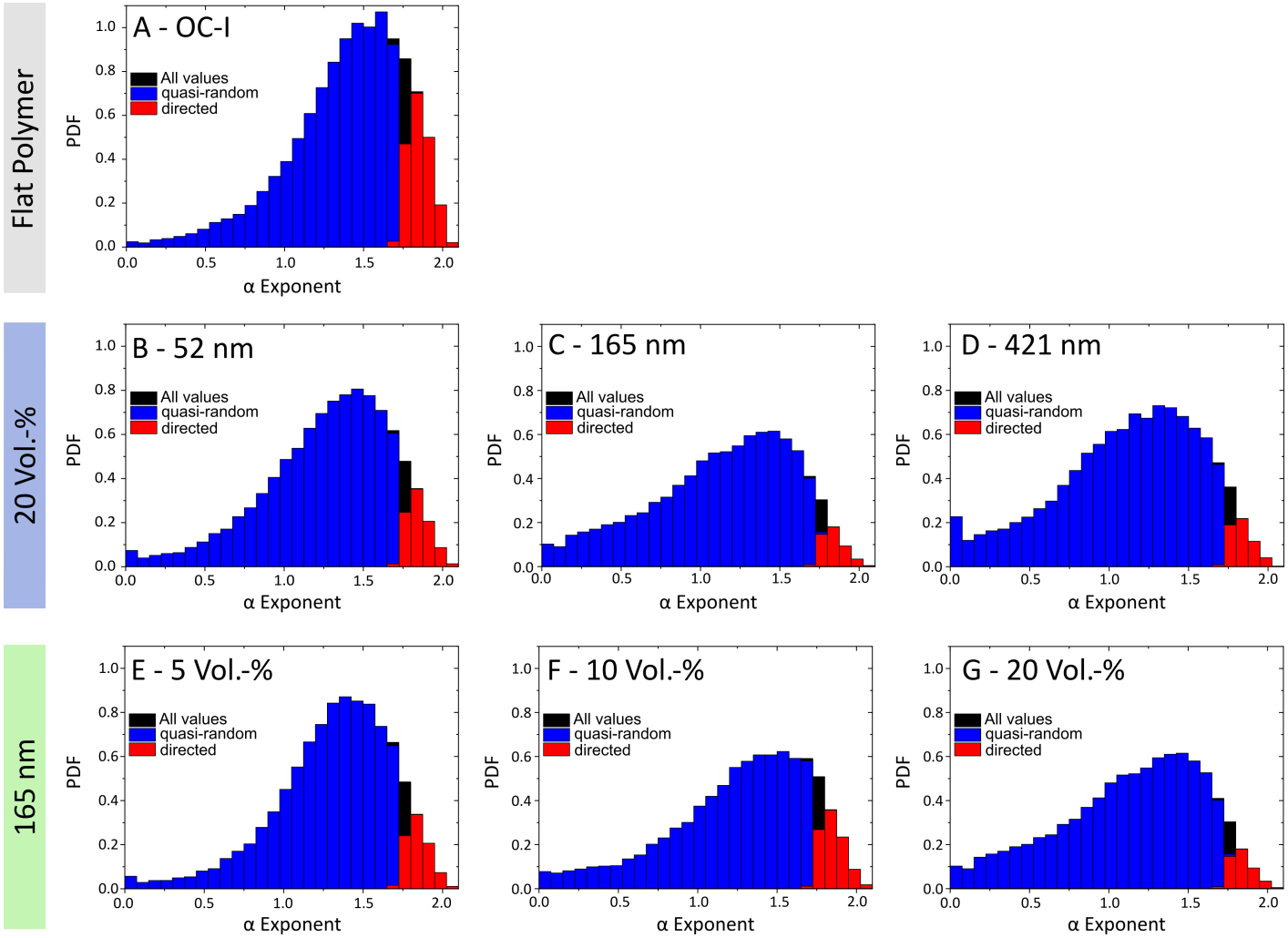

Fig. S1 Probability density distribution of the alpha exponent of cells classified as moving (red: directed states, blue: quasi-random states, black: all values). OC-I (A) serves as reference, while (B-D) are samples with a constant particle density of 20 Vol.-% and increasing particle diameter from 52 nm (B), 165 nm (C) and 421 nm (D). (E-G) are samples with a constant particle diameter of 165 nm and increasing particle density from 5 Vol.-% (E), 10 Vol.-% (F) and 20 Vol.-% (G).

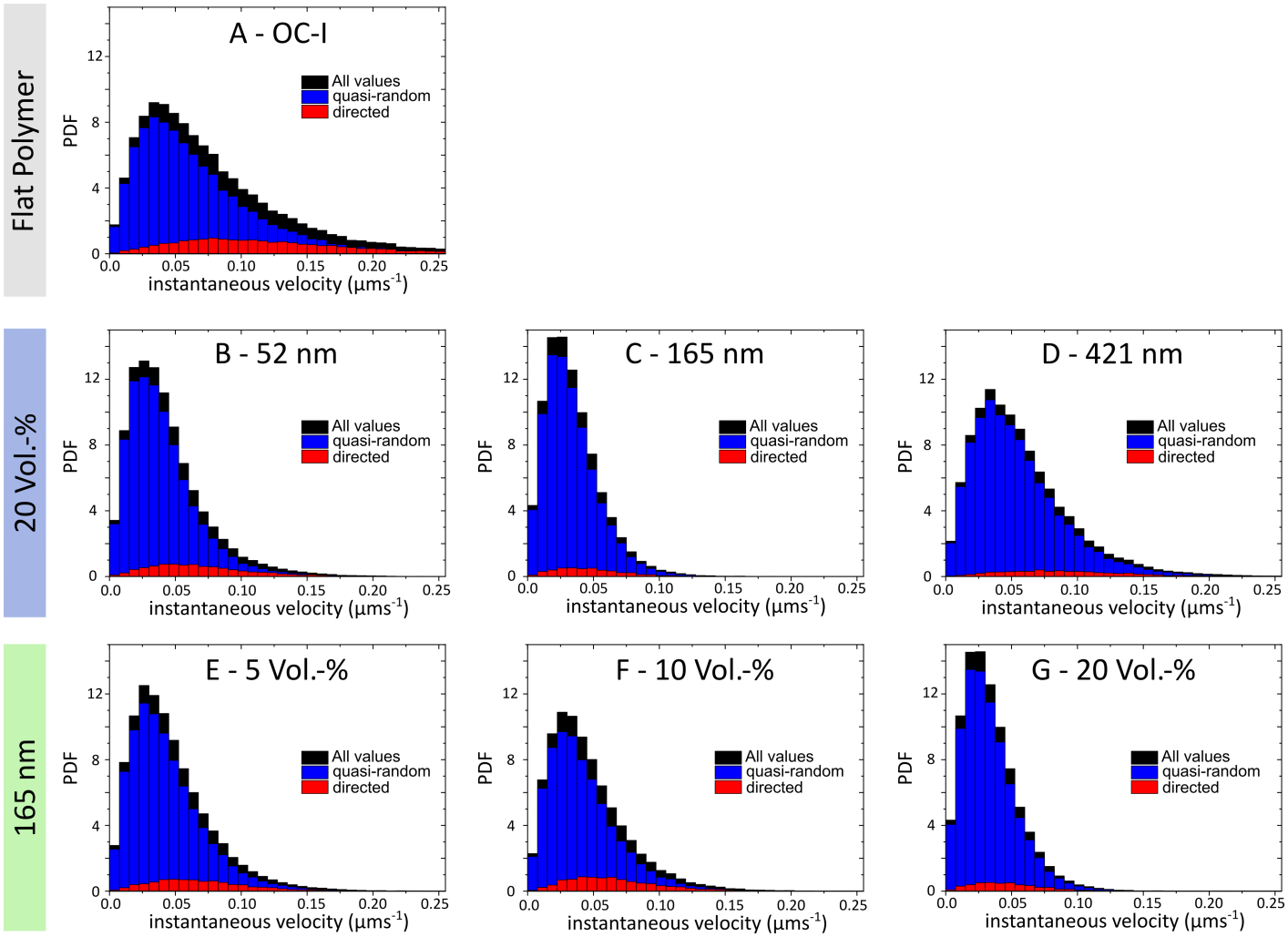

Fig. S2 Probability density distribution of the instantaneous velocity of cells classified as moving (red: directed states, blue: quasi-random states, black: all values). OC-I (A) serves as reference, while (B-D) are samples with a constant particle density of 20 Vol.-% and increasing particle diameter from 52 nm (B), 165 nm (C) and 421 nm (D). (E-G) are samples with a constant particle diameter of 165 nm and increasing particle density from 5 Vol.-% (E), 10 Vol.-% (F) and 20 Vol.-% (G).

5 ORMOCER® coating of silica particles at surface of composite layers

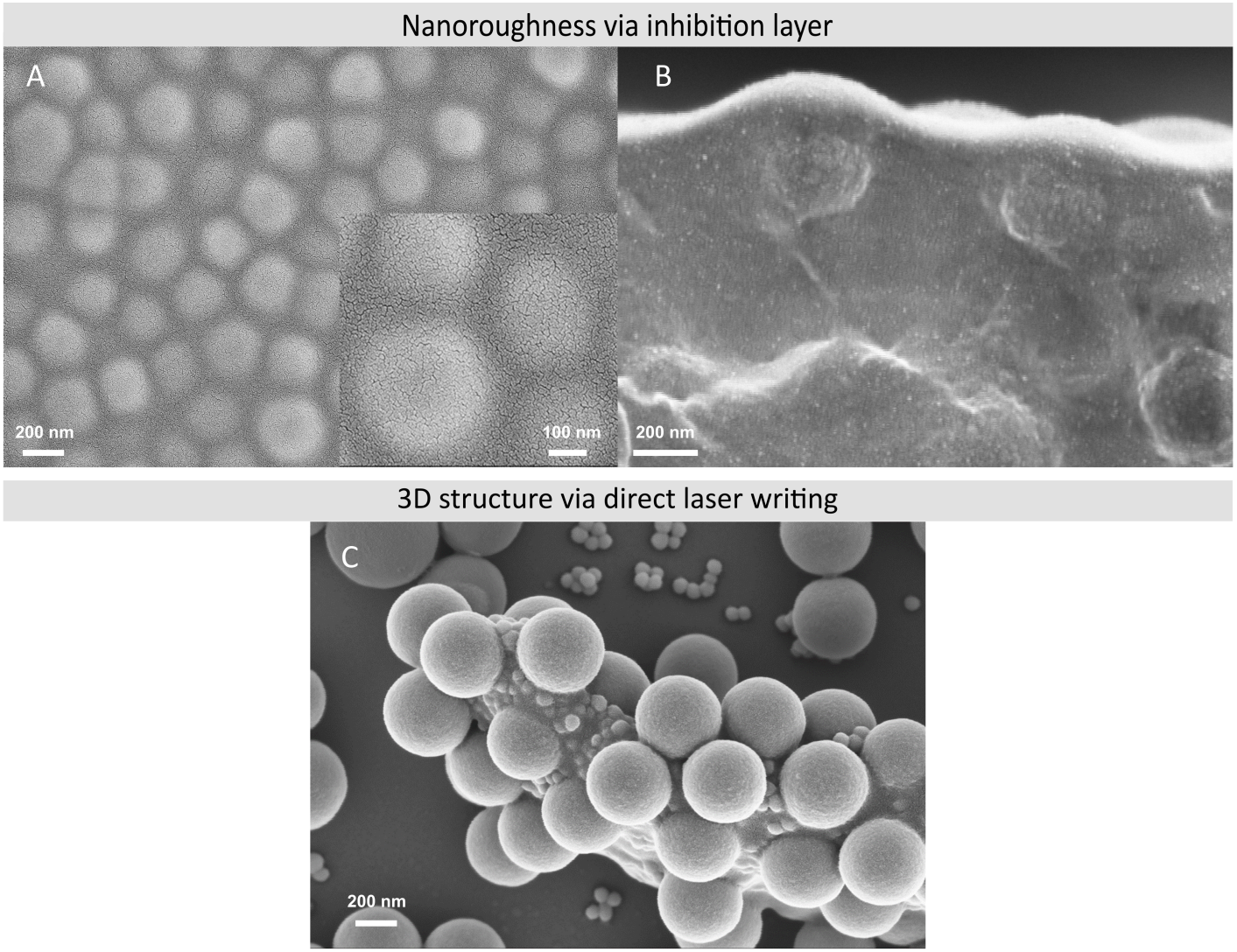

Fig. S3 Scanning electron microscopy images of ORMOCER® – silica particle composites. A (top-view), B (cross-section) of 421 nm silica particle modified ORMOCER® composite, manufactured using the inhibition layer method. C) 3D structured multi modal composite, polymerized via direct laser writing.

6 Contact angle and calculated surface energy

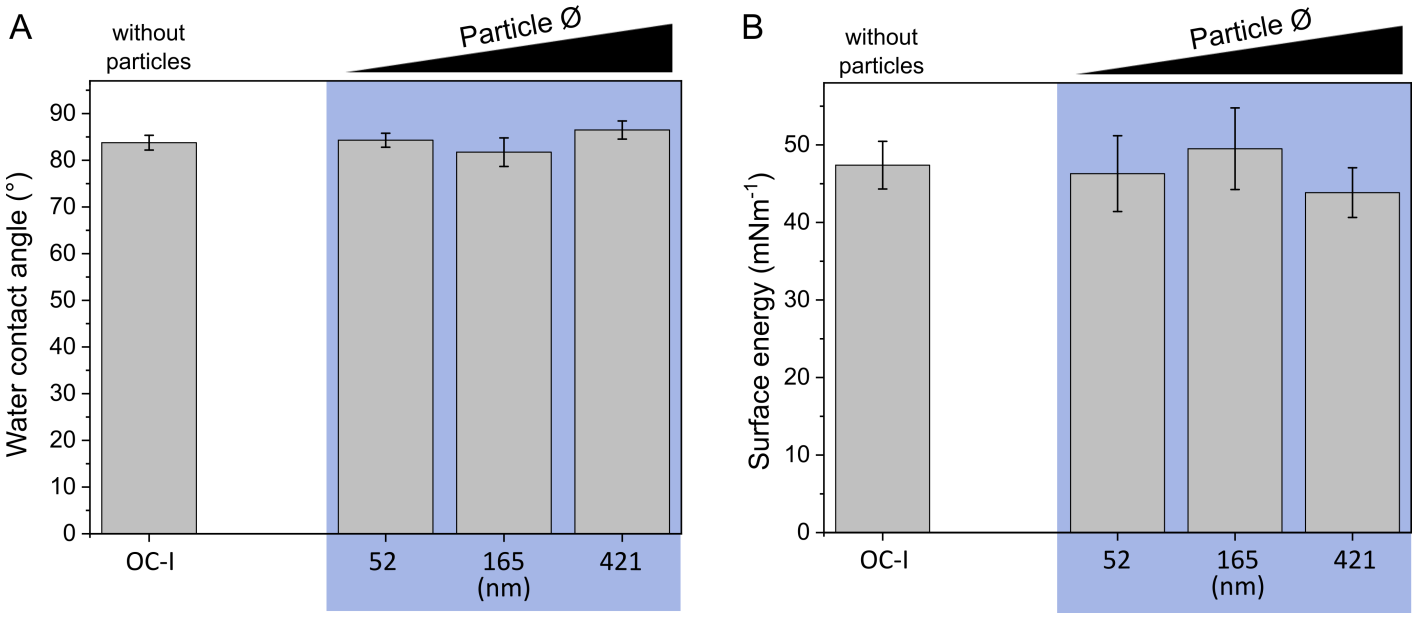

Fig. S4 A) Water contact angle values for ORMOCER® composites, modified with 20 Vol.-% silica particles as well as a flat reference surface without incorporated particles. B) Calculated surface energy based on water and ethylene glycol contact angle measurements, according to Owen-Wendt method.

7 Multi channel migration videos of D. Discoideum cells

Table S4 Exemplary migration time-lapse videos of *D. discoideum* cells.

Sample name	Video file name
OC-I	S1 - OC-I
52-20	S2 - 52-20
165-5	S3 - 165-5
165-10	S4 - 165-10
165-20	S5 - 165-20
421-20	S6 - 421-20