Supporting Information to

Controlled Self-Assembly of Hexagonal Nanoparticle Patterns on Nanotopographies

*Laith F. Kadem, Constanze Lamprecht, Julia Purtov, and Christine Selhuber-Unkel**

**corresponding author; Email: cse@tf.uni-kiel.de*

University of Kiel, Institute for Materials Science, Biocompatible Nanomaterials, Kaiserstr. 2, 24143 Kiel, Germany.

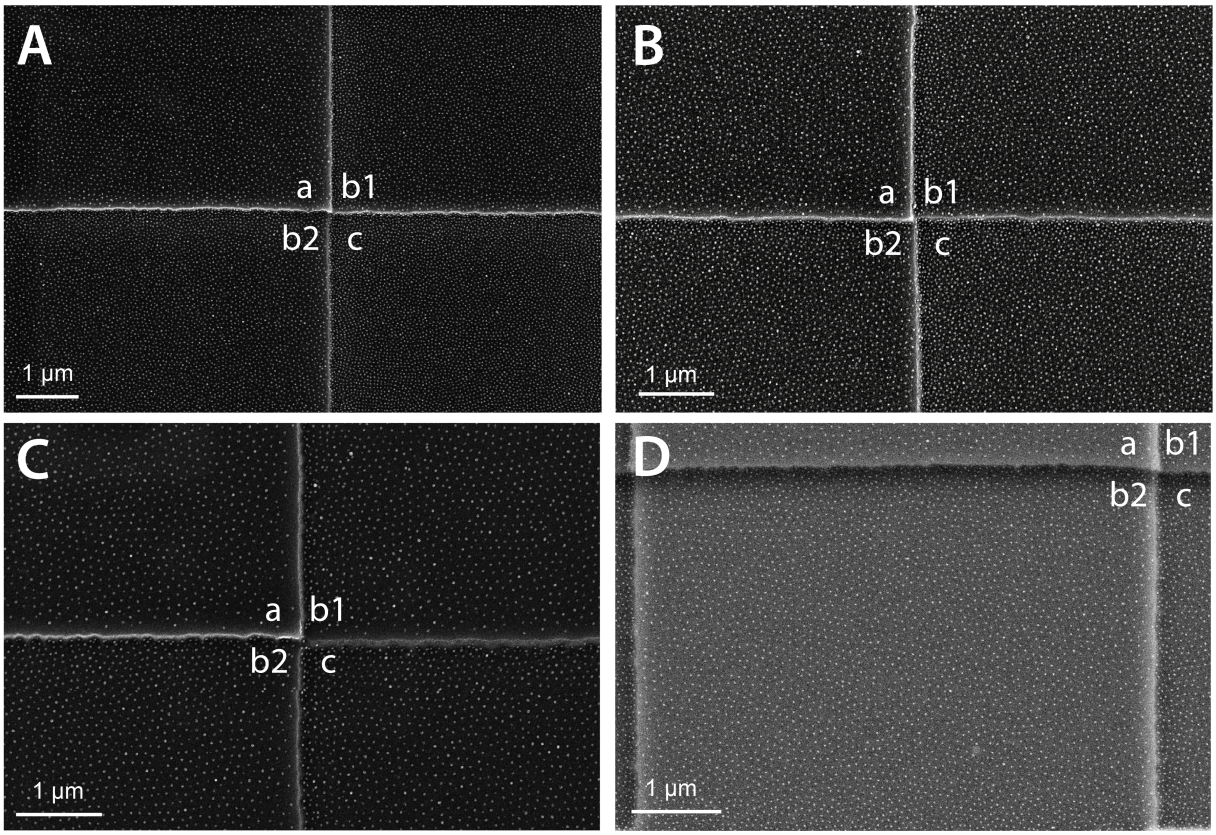

Figure S1. SEM images of nanoparticle patterns prepared at different spin coating speeds. (A) 1000 rpm, (B) 5000 rpm, (C) and (D) 7000 rpm. In the magnified image (D) the depletion in nanoparticles at the edges of topographically higher segments (a towards b2, b2 towards c) and the enrichment in nanoparticles at lower segments (b2 towards a, c towards b2) are clearly visible. The images also show that these depletion/enrichment zones are mainly limited to about the first 200 nm from segment edges.

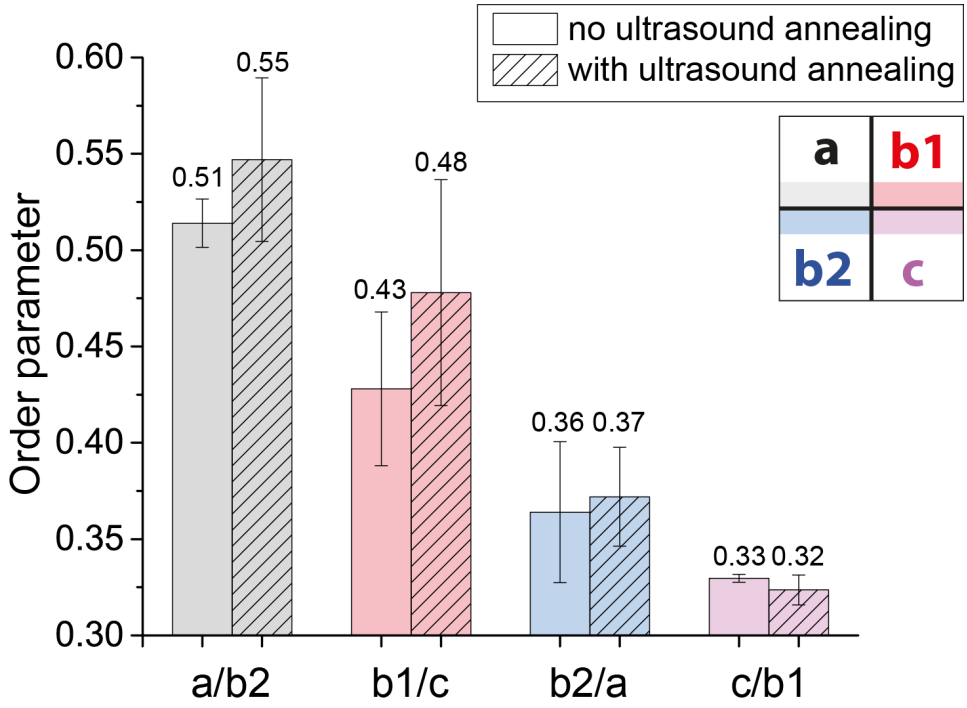

Figure S2. Order parameter of quasi-hexagonal micronanostructures prepared at 1000 rpm spin coating speed in the zone up to 1 µm from segment edges. The inset shows the color code used in the graph. Ultrasound annealing was applied to further homogenize particle distributions. We observe a clear increase of the order parameter for topographically higher segments as a consequence of ultrasound annealing. The determined values are typical order parameters for nanopatterns prepared with BCML.[R1] On segment c, where interparticle spacing is small compared to the other segments the ultrasound annealing does not lead to an improvement of the order parameter. This is in agreement with other studies that have shown consistently lower order parameters for patterns with small interparticle spacing.[R1] Moreover, for the central 2 µm x 2 µm area of each of the four 5 µm x 5 µm segments we have determined an increase in the order parameter of about 4.5 % on segment a, 3 % on segment b1 and 2.5 % on segment b2 by ultrasound annealing. However, there was again no noticeable improvement in order parameter on segment c.

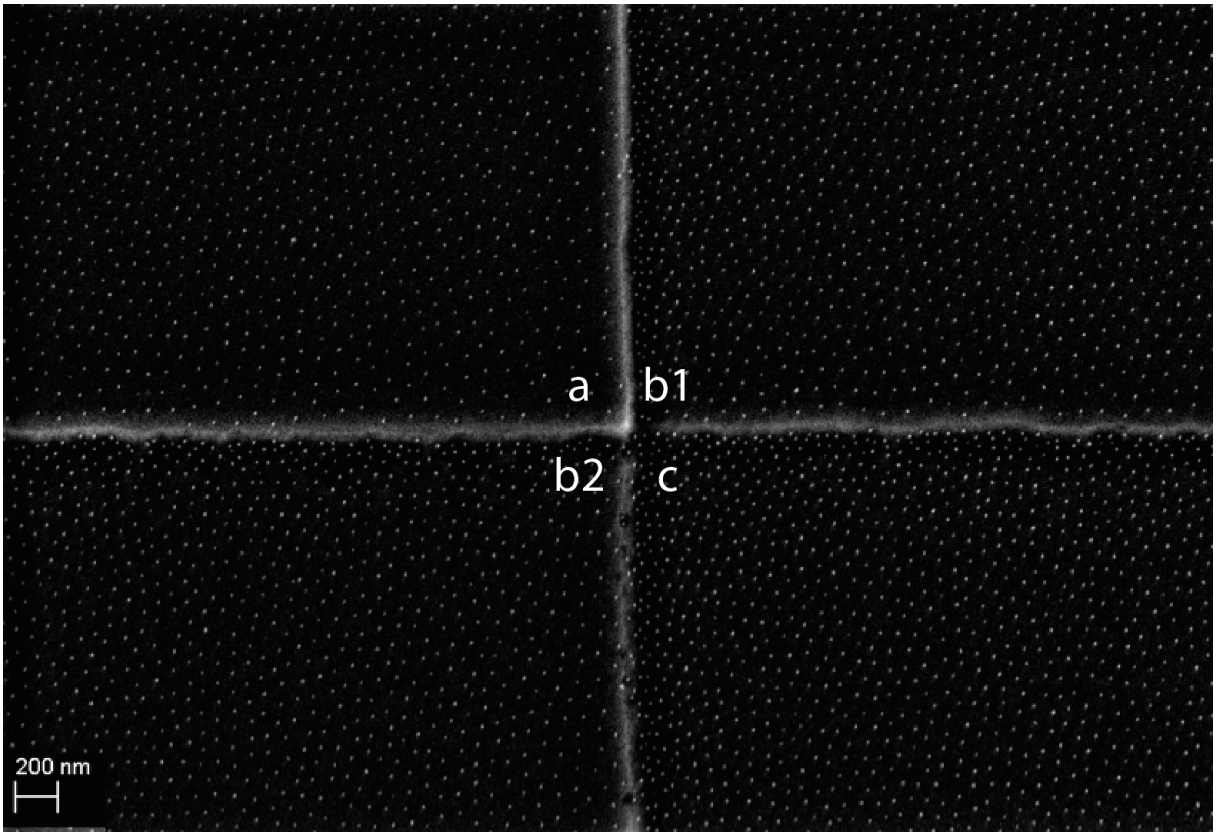

Figure S3. SEM image showing the distribution of nanoparticles in a micronanostructure prepared at 7000 rpm spin coating speed. Order parameter analysis of areas more than 200 nm away from the segment edges yielded order parameters > 0.60 for all four segments, thus being close to the optimum order parameters reported by Williges et al.[R2] This is remarkable, as the nanotopography could be expected to disturb the hexagonality of the nanopattern much more.

References in the Supporting Information:

(R1) Huang, J.; Gräter, S. V.; Corbellini, F.; Rinck-Jahnke, S.; Bock, E.; Kemkemer, R.; Kessler, H.; Ding, J.; Spatz, J. P. Impact of Order and Disorder in RGD Nanopatterns on Cell Adhesion. *Nano Letters* **2009,** *9* (3), 1111-1116.

(R2) Williges, C.; Chen, W.; Morhard, C.; Spatz, J. P.; Brunner, R. Increasing the Order Parameter of Quasi-Hexagonal Micellar Nanostructures by Ultrasound Annealing. *Langmuir* **2013,** *29* (4), 989-993.