Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information for

Fast & Scalable Pattern Transfer *via* Block Copolymer Nanolithography

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This file includes:

Figures S1 to S4

Calculations of polymer-solvent interactions based on Hansen's solubility parameters:

Tables S1, S2.

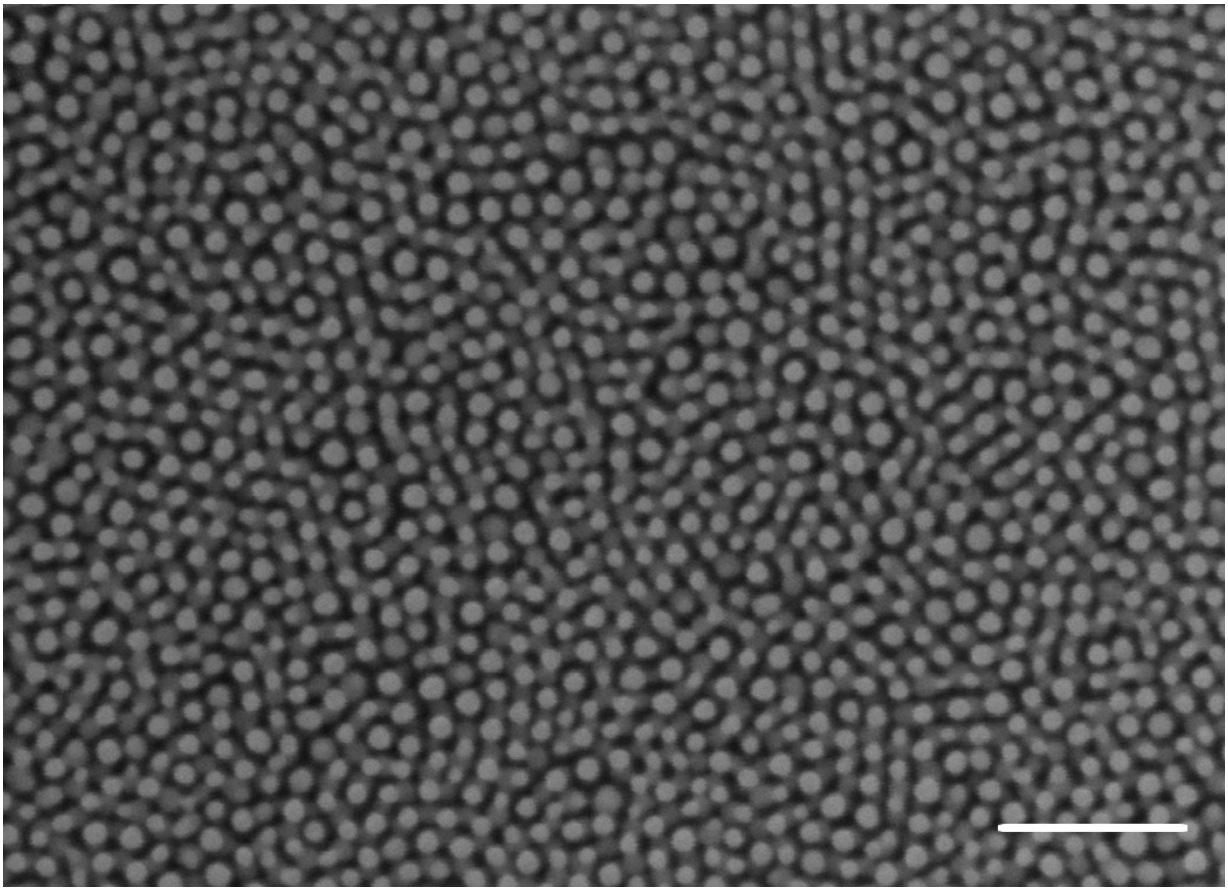

Fig. S1. Top-view SEM image of the 90 nm thick SD39 film spin-cast on a silicon wafer and treated with fluorine and oxygen plasmas to enhance contrast. A multilayer of spheres is clearly visible. Scale bar: 200 nm.

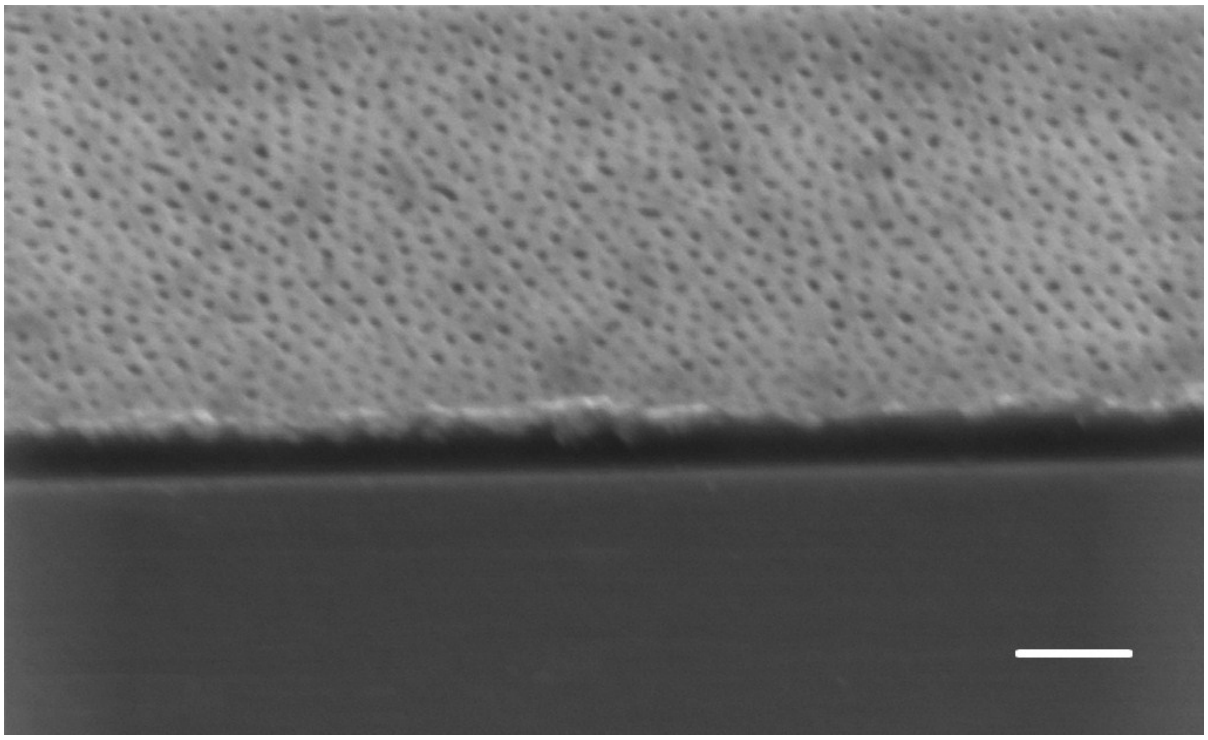

Fig. S2. Tilted SEM image after an attempt to transfer the pattern from SD81 onto SU-8 by O_2 RIE without removing the PDMS wetting layer at the substrate interface. This wetting layer effectively blocks access of the O_2 RIE to the substrate. Scale bar: 200 nm.

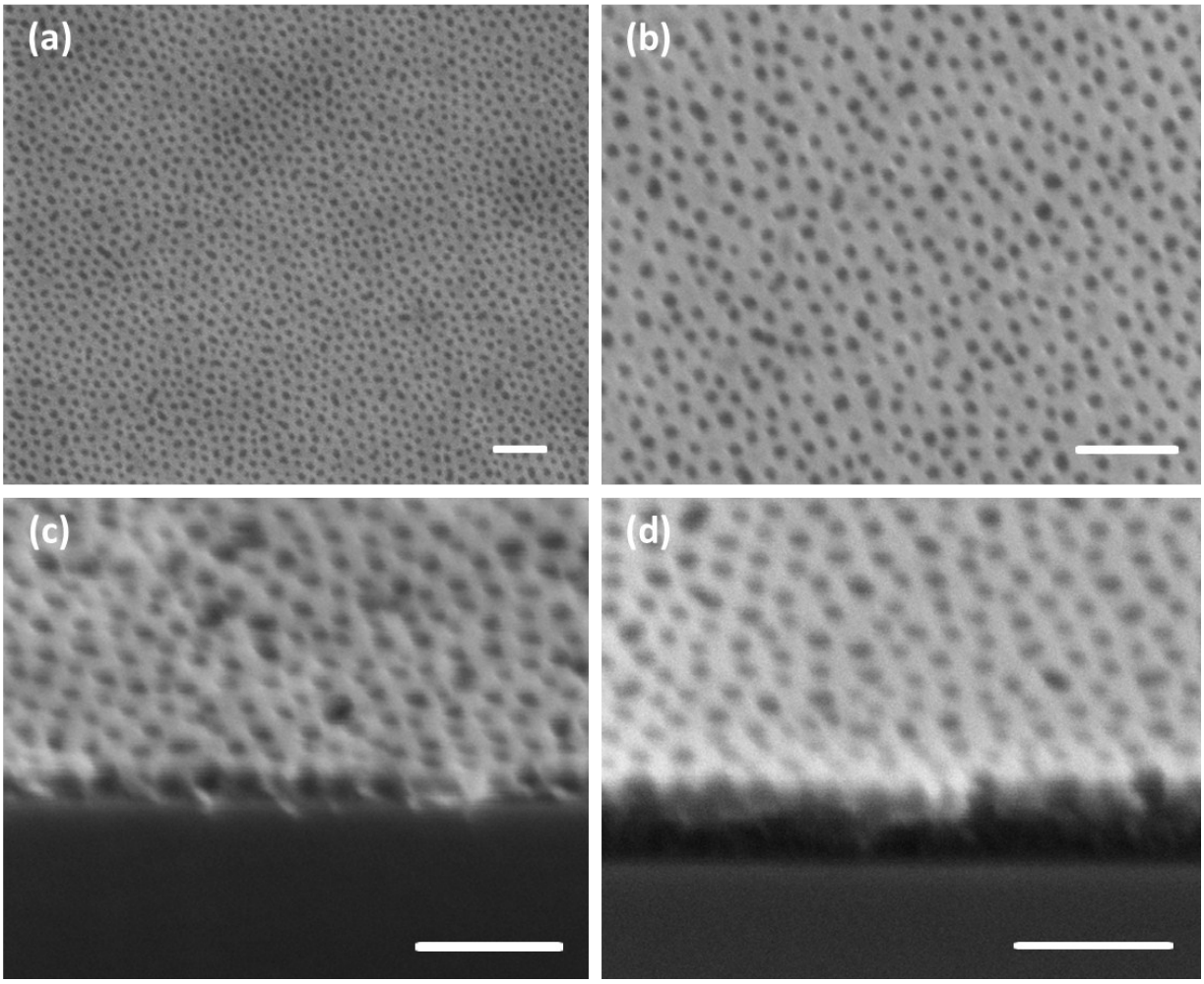

Figure S3. Top-view SEM images of (a) PLA patterned by SD81 and (b) PSF patterned by SD81. Tilted SEM images of (c) PB patterned by SD81 and (d) PMMA patterned by SD81 with partial pattern transfer. Scale bar: 200 nm.

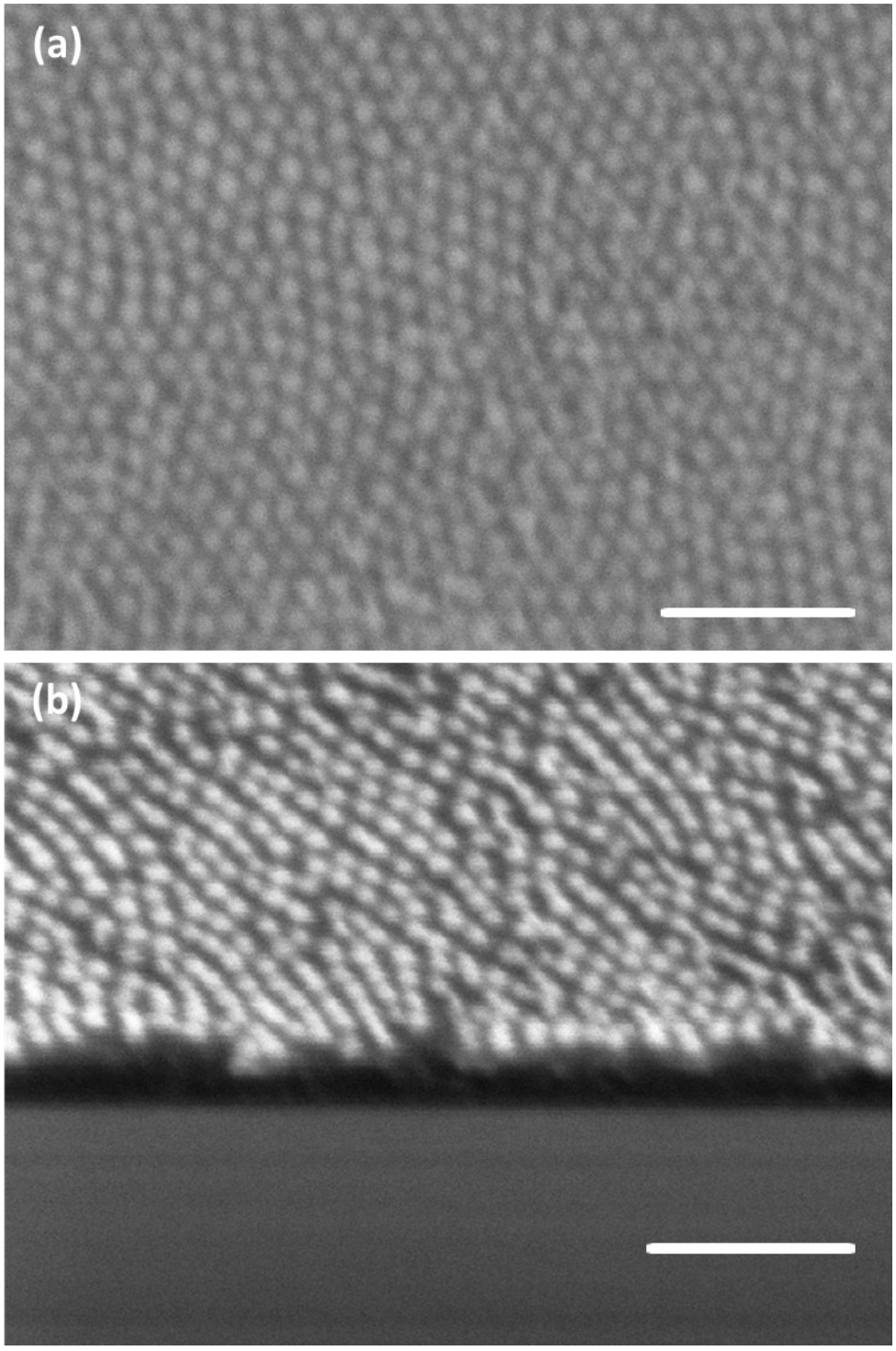

Fig. S4. Top-view (a) and tilted (b) SEM images of SU-8 after a patterning attempt by O_2 plasma in the presence of a hard mask derived from SD39. A layer of about 40 nm SU-8 has been removed by the plasma; however no pattern transfer can be discerned on the remaining SU-8 (see discussion in the manuscript). Scale bar: 200 nm.

Calculations based on Hansen's solubility parameters:

Table S1. Hansen solubility parameters (*)

Solvent	Solubility parameters: δ_D, δ_P, δ_H ($MPa^{1/2}$)
Hexane	14.9, 0.0, 0.0
Methylcyclohexane	16.0, 0.0, 1.0
Toluene	18.0, 1.4, 2.0
Tetrahydrofuran	16.8, 5.7, 8.0
Cyclopentanone	17.9, 11.9, 5.2
PDMS	15.9, 0.0, 4.1
PS	17.6, 6.1, 4.1

(*)given in

From the above values we calculate the Hansen distance of PS, resp. PDMS relative to the solvents: toluene, THF, methylcyclohexane, hexane, cyclopentanone. The Hansen distance is defined by:

$R_a = (4\Delta\delta_D^2 + \Delta\delta_P^2 + \Delta\delta_H^2)^{½}$, where $\Delta\delta_X^2 \equiv (\delta_{X,polymer} - \delta_{X,solvent})^2$ and X = D (dispersion), P (polar), H (H-bond) interactions. By these definitions the calculated R_a values are listed in Tab. S2.

Table S2. Hansen solubility 'distances' for the two blocks relative to the used solvents.

	Toluene	THF	MChexane	Hexane	CPentanone
PS	5.2	4.2	7.6	9.1	5.9
PDMS	5.0	7.1	3.1	4.6	12.6

It can be seen that toluene is almost exactly a neutral solvent, THF (MChexane) becomes more selective towards PS (PDMS), while Hexane (CPentanone) is strongly selective relative to PDMS (PS). The R_a values for PS-hexane and PDMS-CPentanone are typical for non solvents.