Application Note

HEIDELBERG INSTRUMENTS

Maskless photolithography with the MLA150 and its 405 nm laser

by Théophane Besson, HIMT (in collaboration with CMi, EPFL)

The MLA 150 is a new generation laser writer aiming to provide a different and faster approach to standard photolithography. The embedded technology allows quick configuration, sub micrometric alignment and fast exposure of CAD designs within a few minutes, without the need to produce a photomask. This is a presentation of resists that have been tested with the MLA150 along several SE illustrations.

Resist	Film thick. [um]	Dose [mJ/cm^2]	Defoc [-10..10]	CD [um]
AZ 1512	1.6	130	-2	2
AZ 1512	1.1	90	-2	1.5
AZ 9260	4	190	2	1.4
AZ 9260	10	350	3	1.6
AZ ECI 3007	0.6	120	-2	1
AZ ECI 3007	1	160	-2	1.2
AZ ECI 3027	2	320	-2	1.4
AZ ECI 3027	4	650	-2	1.4
AZ ECI 3027	5	800	-2	1.5
AZ P4000	5	500	0	2
AZ P4000	10	900	2	3
AZ P4000	20	1800	6	4
ma-P 1205	0.5	110	0	1
ma-P 1205	1	110	0	1
ma-P 1225	2.5	140	0	1.5
ma-P 1225	4.5	200	0	1.5
S1805	0.5	100	0	1
S1805	1	150	-1	1.2
AZ4562	6.2	200	2	1.5
mr-DWL	40	250 – 350	0 – 10	2
mr-DWL	80	300 – 400	0 – 10	3

Application Note

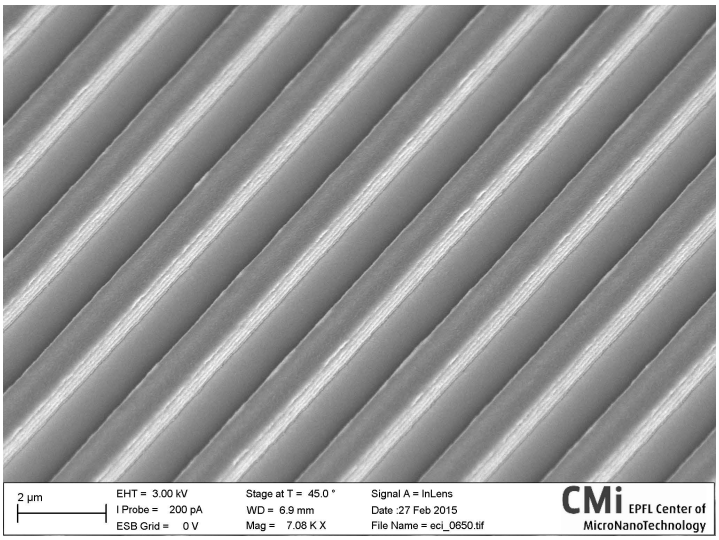

Fig. 1: AZ ECI 3007, 0.6 um thick, 1.2 um lines and spaces

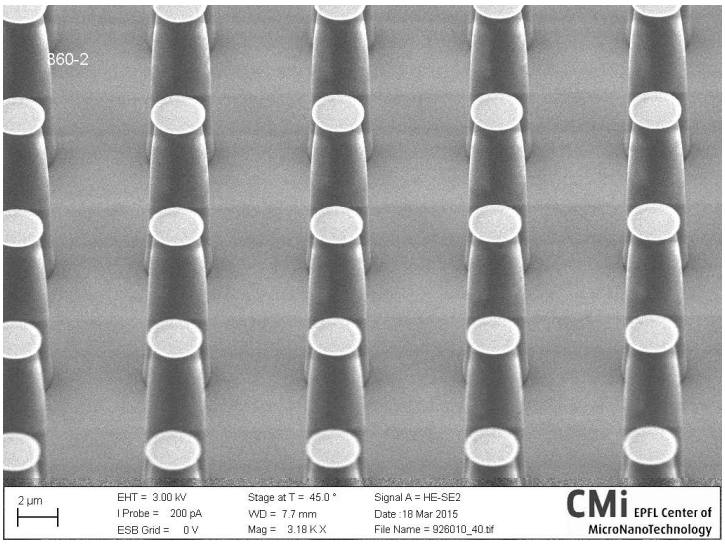

Fig. 2: AZ 9260, 10 um thick, pillars with a diameter of 4 um

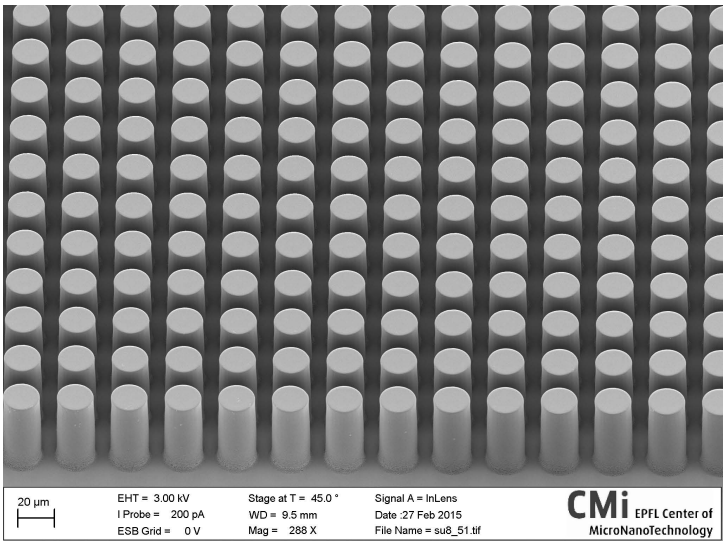

Fig. 3: mr-DWL 40, 40 um thick, pillars with a diameter of 20 um

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Examples of structures exposed in mr-DWL negative resist:

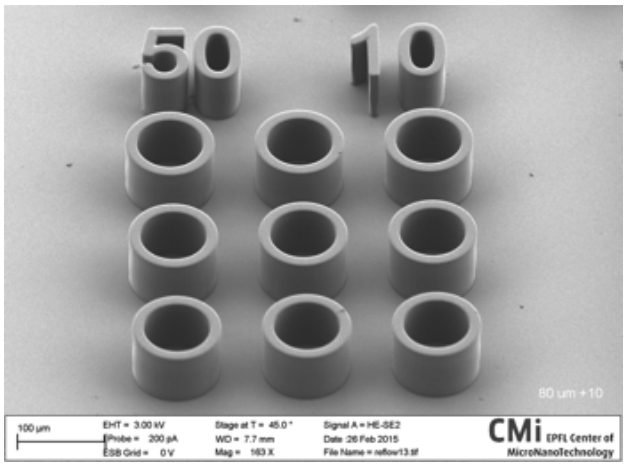

Fig. 4: mr-DWL 40, 80 um thick, 100 um wide cylinders with 10 um wide walls

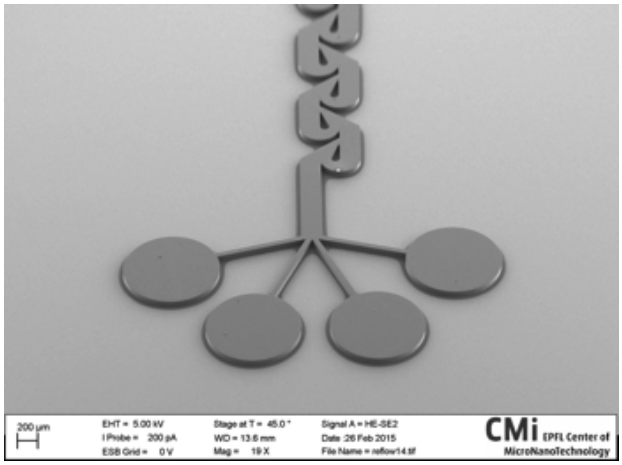

Fig. 5: mr-DWL 40, 80 um thick, microfluidic device

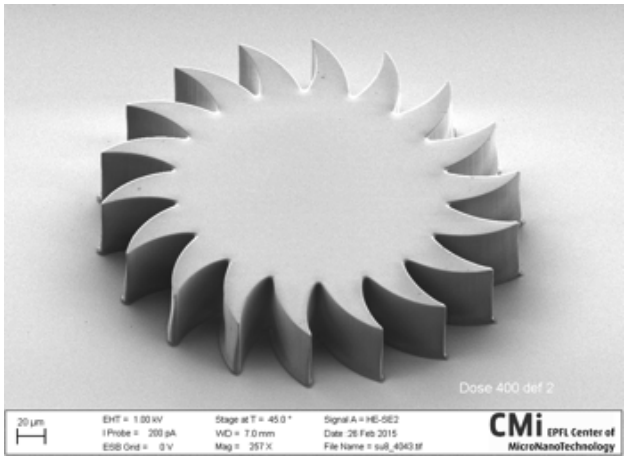

Fig. 6: mr-DWL 40, 40 um thick, gear wheel

Examples of structures exposed in mr-DWL thick resist:

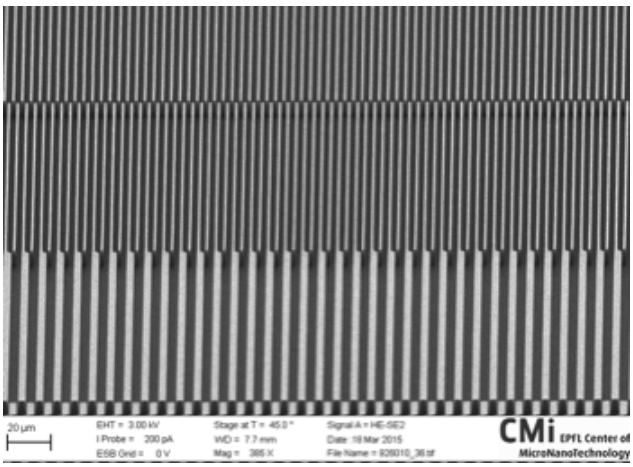

Fig. 7: AZ 9260, 10 um, 4 um and 2 um lines and spaces

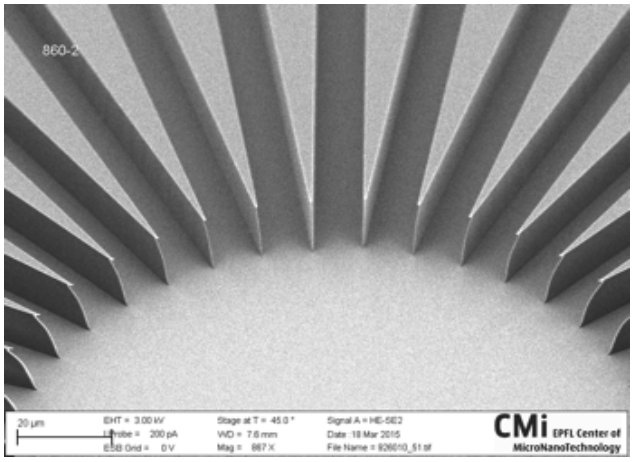

Fig. 8: AZ 9260, 10 um thick, 10 um spaces forming an asterisk

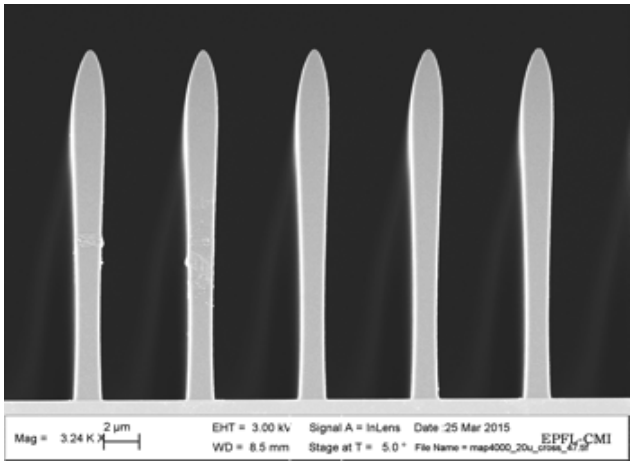

Fig. 9: AZ P4000, 20 um thick, cross-section of 1.5 um lines, 4.5 um spaces

Examples of structures exposed in thinner positive resists:

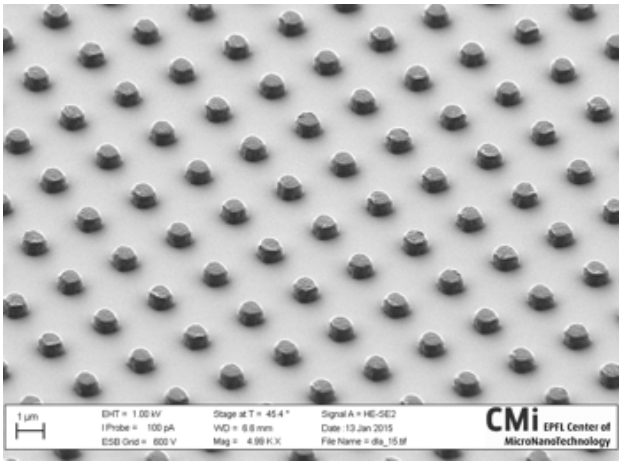

Fig. 10: AZ ECI 3007, 0.6 um thick, 0.9 um pillars with 1.5 um spaces

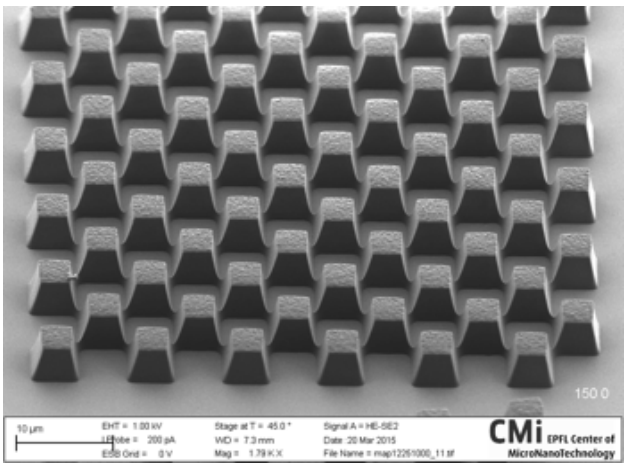

Fig. 13: ma-P 1225, 4.5 um thick, 5 um checkerboard

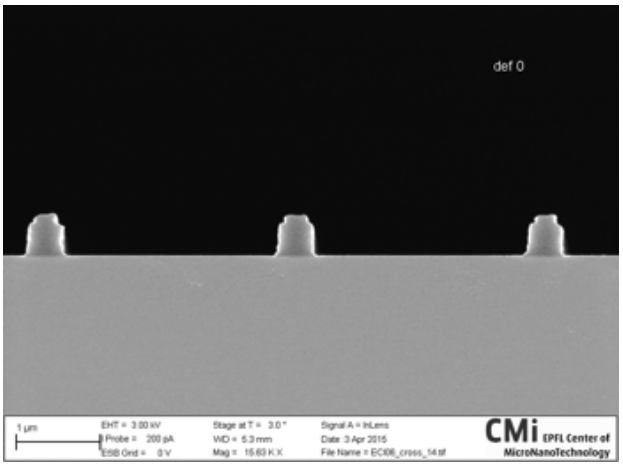

Fig. 11: AZ ECI 1207, 0.6 um thick, cross-section of 0.5 um lines with a period of 3 um

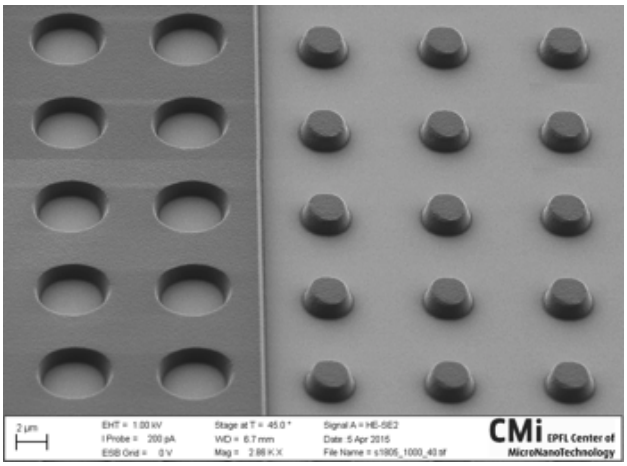

Fig. 14: S1805, 1 um thick, holes and circles with a radius of 2 um

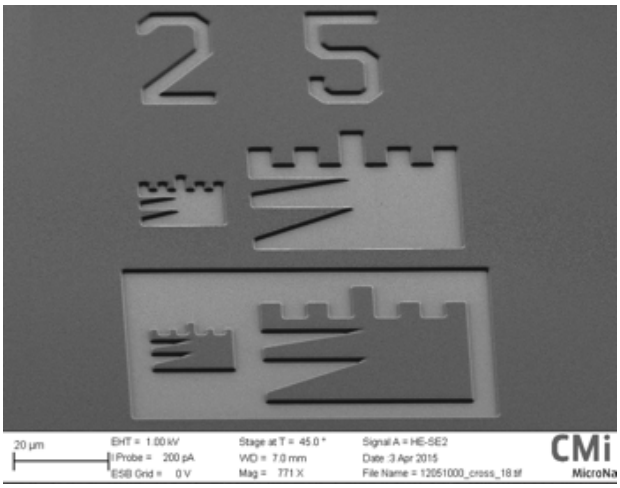

Fig. 12: ma-P 1205, 1 um thick, resolution test structure

Heidelberg Instruments Mikrotechnik GmbH
Tullastrasse 2 · D-69126 Heidelberg · GERMANY
Phone +49 6221 34300
Fax +49 6221 343030
E-Mail info@himt.de
WEB www.himt.de