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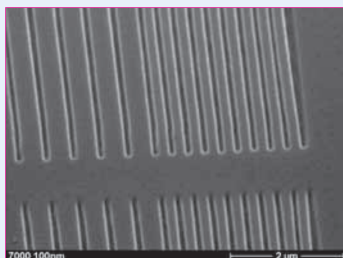
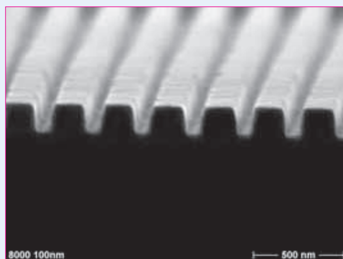
micro resist technology

Thermoplastic Polymers for Nanoimprint Lithography

mr-I 7000E, mr-I 8000E — Thermoplastics with Improved Imprinting Behaviour



100 nm trenches, pitch 300 and 500 nm,
Film thickness: 200 nm
Imprint: 130 °C, 3 min, 50 bar
Complete filling of stamp cavities
Residual layer thickness < 10 nm



100 nm trenches, pitch 300 nm,
Film thickness: 200 nm
Imprint: 190 °C, 3 min, 50 bar
Complete filling of stamp cavities
Residual layer thickness < 10 nm

Unique features

- Excellent film quality
- Plasma etch resistance superior to PMMA
- Attainable smallest feature size at least 50 nm (depending on stamp resolution)
- Safe solvents

Imprint characteristics superior to mr-I 7000 and mr-I 8000 polymers

✓ Lower imprint pressure
✓ Lower residual layer thickness
✓ Shorter cycle times due to faster imprint

Imprint conditions

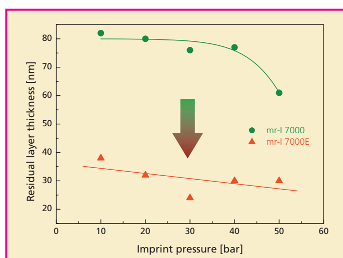
mr-I 7000E

- T_g 60 °C
- Imprint temperatures 125 - 150 °C
- Imprint pressure 20 - 50 bar
- Etch selectivity to SiO_2 about 2 (CHF_3 plasma)
- Ready-to-use solutions for 100 nm, 200 nm, 300 nm film thickness (3000 rpm)

mr-I 8000E

- T_g 115 °C
- Imprint temperatures 170 - 190 °C
- Imprint pressure 20 - 50 bar
- Etch selectivity to SiO_2 about 2 (CHF_3 plasma)
- Ready-to-use solutions for 100 nm, 200 nm, 300 nm film thickness (3000 rpm)

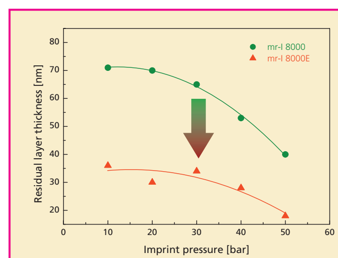
Lower residual layer thickness under gentle imprint conditions



mr-I 7000 vs. mr-I 7000E

Residual layer thickness as a function of imprint pressure

Film thickness: 200 nm
Imprint: 10 s @ 100 °C
Incomplete filling of stamp cavities

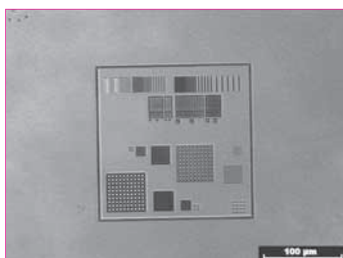


mr-I 8000 vs. mr-I 8000E

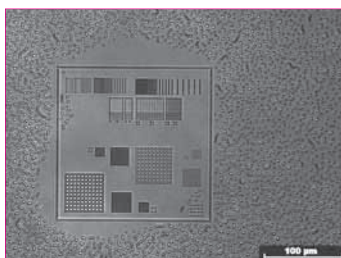
Residual layer thickness as a function of imprint pressure

Film thickness: 200 nm
Imprint: 10 s @ 160 °C
Incomplete filling of stamp cavities

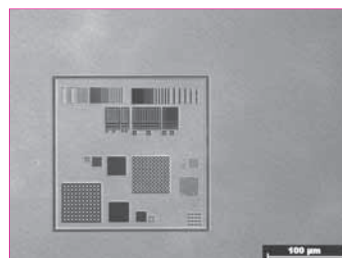
Defect-free imprints at lower pressure



mr-I 7000
130 °C, 3 min,
50 bar
no defects



mr-I 7000
130 °C, 3 min,
20 bar
insufficient polymer flow



mr-I 7000E
130 °C, 3 min,
20 bar
no defects

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