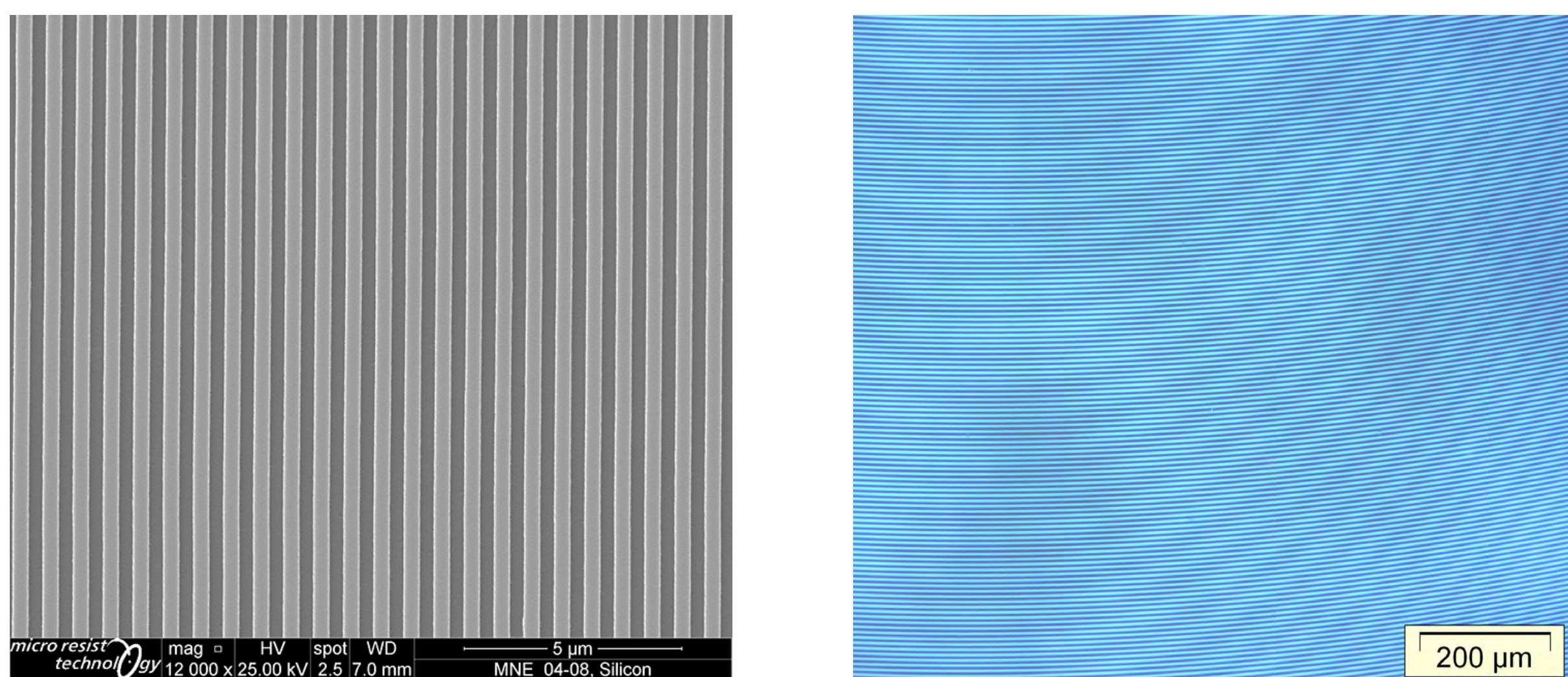


mr-NIL200 Series – Next Generation UV-NIL Resist for Industrial Manufacturing of Micro and Nanopatterns

The mr-NIL200 series are photo-curable NIL resist formulations specifically developed for UV nanoimprint lithography (UV-NIL) applying gas-impermeable stamp materials. The typical application field of mr-NIL200 is the use as an etch mask in pattern transfer processes for e.g. photonic applications via reactive ion etching approaches. The mr-NIL200 series is available as ready-to-use formulations and works without the need for any additional adhesion promoter or primer.

Application examples

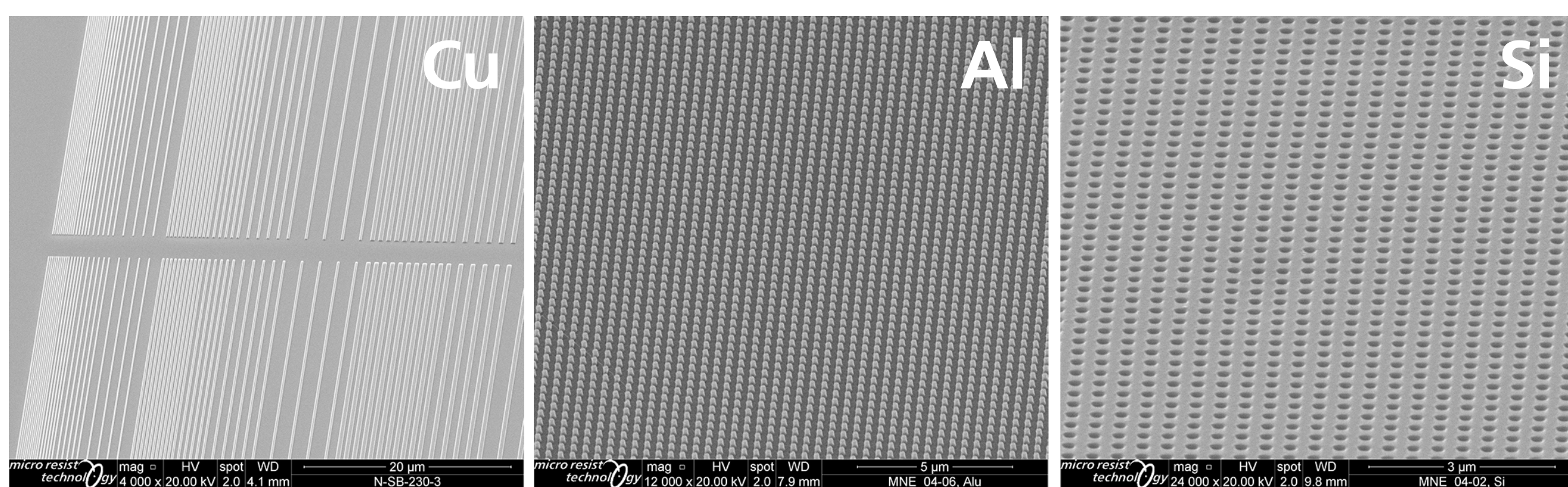
High accuracy UV-NIL using mr-NIL200 for e.g. photonic applications



mr-NIL200-200nm imprints of photonic zone plate structures on Si (360nm width, 700nm pitch, 150nm depth)

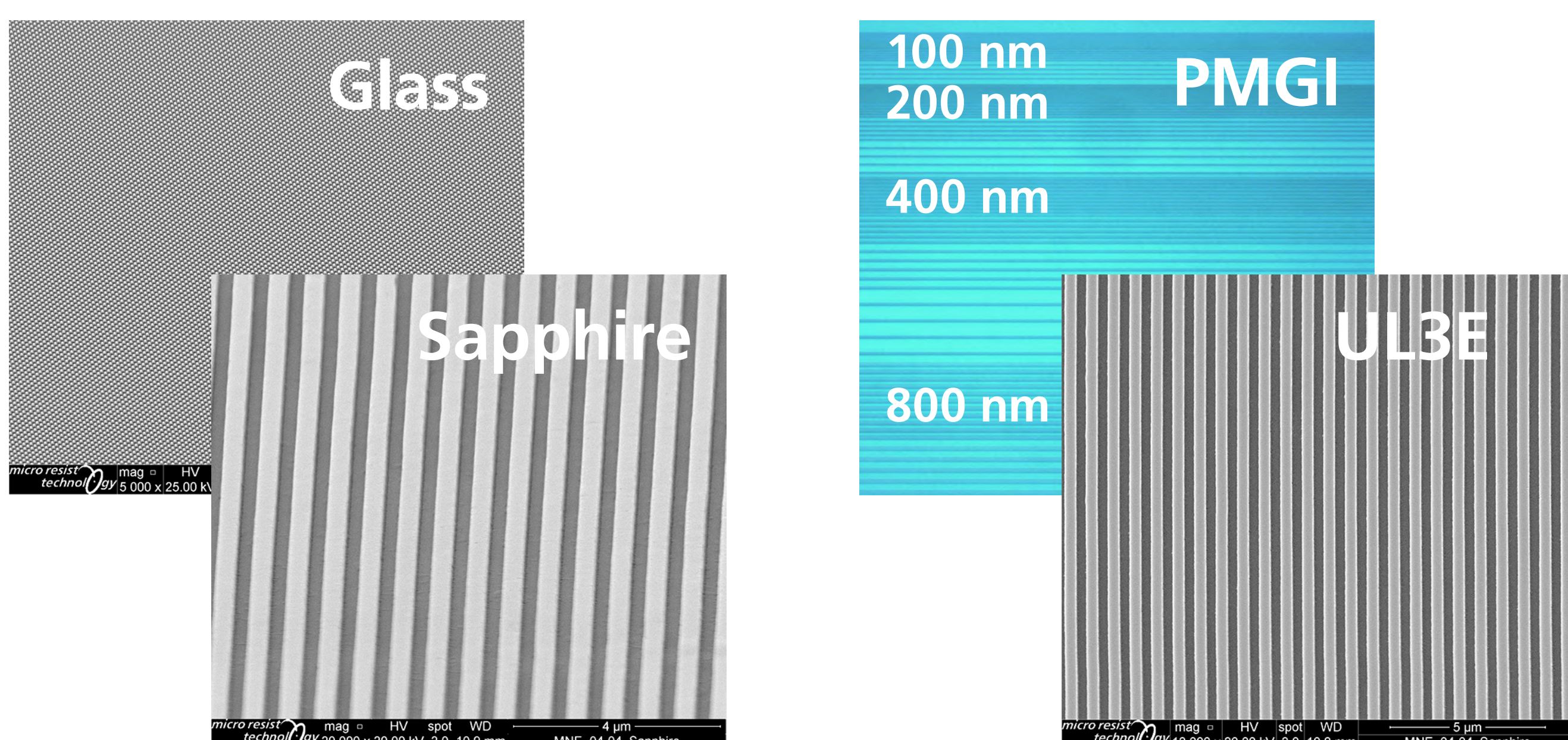
Primer-free imprinting for high volume manufacturing:
 No adhesion promoter needed for various substrates

• Silicon wafers and metal substrates



mr-NIL200-200nm imprints of L&S pattern on Cu, 25x25 mm² dense pillar array on Al (Ø = 200nm, height = 300 nm), and the inverted array on glass.

• Oxidic substrate materials • Organic underlayers



mr-NIL200-200nm imprints of photonic color pattern on sapphire (360nm width, 700nm pitch, AR1 and 25x25 mm² dense pillar array on glass (right, Ø = 200nm, height = 300 nm)

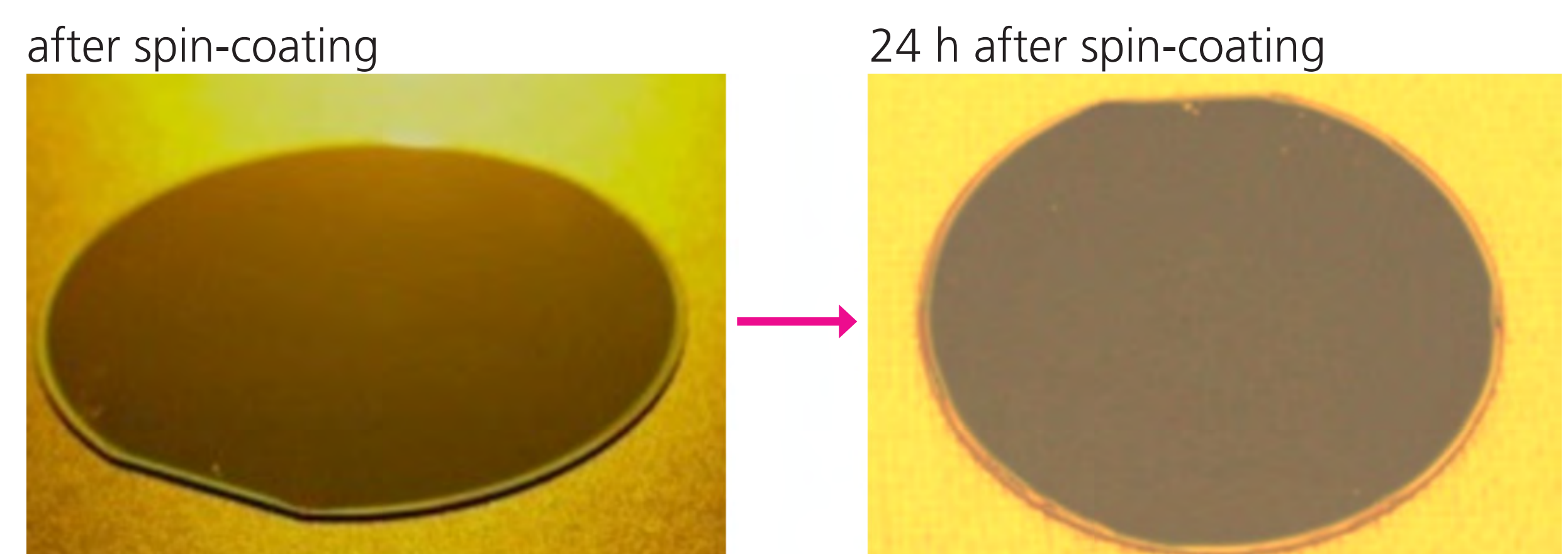
mr-NIL200-200nm imprints of L&S arrays on Polymethylglutarimid PMGI/ LOR (depth 100nm) for alkaline lift-off and 350nm L&S pattern AR1 on UL3E underlayer for neutral lift-off

Main product features

- Primer-free coating („self-priming“) of substrates like Si, metals (e.g. Cu or Al), oxidic materials (e.g. SiO₂ or Al₂O₃), and underlayer materials (e.g. LOR, UL1, or UL3E)
- UV-curing chemistry insensitive towards ambient atmosphere and oxygen
- Low viscosity renders fast cavity filling of small structures by capillary forces
- Etch mask for nanopattern transfer via e.g. RIE

Film characteristics

- Outstanding film stability and film thickness uniformity over several hours without the need of additional primers.
- Example: 100nm thin film on oxygen plasma cleaned Si wafers persist for several hours:



- Available film thickness : 100 nm, 200 nm, 300 nm and other film thickness available on request

Photo-Nanoimprinting

- Fast filling of small cavities due to low resist viscosity (200 mPas after spin-coating and pre-bake)
- Particularly suitable for being applied in combination with gas-impermeable working stamp materials (e.g. OrmoStamp®, COC, FEP)
- Features additional fluorinated additive to lower stamp release forces
- Photo-curing by LED (up to 405 nm) or H_g bulb exposure

Dry etching characteristics and stripping

- Excellent etching characteristics for many demanding substrates like sapphire, silica, etc.
- Residue-free removal of cured resist by oxygen plasma stripping