mr-UVCur26SF - A New Photo-Curable NIL Resist

Applicable by Inkjet Dispensing and in Roll-to-Roll NIL Processes

Unique Features
- Organic, photo-curable nanoimprint resist for inkjet dispensing
- Excellent imprint characteristics
- Compatibility to various mold materials: Ni, Si, OrmoStamp®
- High stability of the cured patterns
- Excellent dry etch resistance for pattern transfer

Applications
- Step&Repeat NIL process
- Large-area nanostructuring of flexible substrates
- Continuous roll-to-roll (R2R) Photo-NIL processes
- High volume manufacturing of
  - Antireflective coatings
  - (Super)Hydrophobic patterns on flexible substrates
  - Wire-grid polarizers

Inkjet Dispensing
- Low viscosity (15 mPas)
- Liquid and solvent-free formulation
- Broad compatibility with commercial inkjet tools
- Proven droplet volume stability over a period of 300 s

Roll-to-Roll NIL
- Good adhesion to plastic foil substrates
- Ultra-high photocuring rate enabling high roller speeds and high throughput
- R2R web speeds up to 30 m min⁻¹ demonstrated
- Constantly high pattern fidelity at various throughput rates

Commercial inkjet printheads featuring different nozzle numbers applied for dispensing of mr-UVCur26SF

<table>
<thead>
<tr>
<th>Inkjet printhead</th>
<th>Manufacturer</th>
<th>Nozzle no.</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>MJ-ABP-01-50</td>
<td>MicroFab</td>
<td>1</td>
<td>25 °C</td>
</tr>
<tr>
<td>Spectra SL-128</td>
<td>Fujifilm Dimatix</td>
<td>128</td>
<td>25 °C</td>
</tr>
<tr>
<td>Spectra SM-128</td>
<td>Fujifilm Dimatix</td>
<td>128</td>
<td>25 °C</td>
</tr>
<tr>
<td>Sapphire QS-256/30</td>
<td>Fujifilm Dimatix</td>
<td>256</td>
<td>25 °C</td>
</tr>
<tr>
<td>Polaris PQ-512/15</td>
<td>Fujifilm Dimatix</td>
<td>512</td>
<td>25 °C</td>
</tr>
<tr>
<td>KM1024</td>
<td>KonicaMinolta</td>
<td>2 x 512</td>
<td>25 °C - 40 °C</td>
</tr>
</tbody>
</table>

Antireflective coating on PC with mr-UVCur26SF: moth-eye pattern imprinted on PC foil by a R2R-NIL process (Courtesy of IMRE, Singapore)

R2R-NIL on PC foil: AR1 L&B pattern, 500 nm pitch, inkjet dispensed mr-UVCur26SF, pristine Ni roller molds, 405 nm LED radiation, throughput speed 10 m min⁻¹ (machine limit). Insert: SEM image of the imprint (Courtesy of IMRE, Singapore)

R2R-NIL with mr-UVCur26SF: SEM images after variation of the web speed, substrate PET foils, room temperature gravure coating, SAM fluorinated Ni roller molds, Hg bulb radiation for curing (Courtesy of Joanneum Research Materials, Austria)