Nanoimprint Lithography (NIL)-Based Patterning of Chemically Strengthened Glass Sheets

J. Gaspar, K. Thulin, and P. Lundström
Obducat Technologies AB, Scheelevägen 2, SE-223 63 Lund, Sweden
joao.gaspar@obducat.com

V. Chu
INESC Microsistemas e Nanotecnologias (MN), Rua Alves Redol 9, 1000-029 Lisbon, Portugal

Chemically strengthened glass, namely in the form of alkali-aluminosilicate sheets, has been designed to be thin, light and damage-resistant and, as a consequence, has been explored over the last years mainly as the cover glass for portable electronic devices (mobile phones, media players, portable computers and displays). Additionally, such applications can be further enhanced by modifying the texture and/or topography of the displays surface, e.g. by patterning diffusive features into them, defining micro and nano lenses for light guiding or etching arrays of nano features to engineer hydrophobicity. Defining nanopatterns and transferring them into such surfaces still involves challenges in terms of materials adhesion, plasma etch chemistry and quality of obtained features, to name a few.

This work reports on the advanced micro- and nanopatterning of surfaces of alkali-aluminosilicate glass. Patterns are created by means of nanoimprint lithography (NIL) on 200-mm-diameter substrates and transferred by reactive ion etching (RIE) using a SF_6-based plasma chemistry. The current process presents anisotropic profiles with etch selectivity glass/resist better than 1 and glass etch rates in order of 100 nm/min. A detailed study in terms of NIL parameters will be presented along a thorough description of the effect of the various etch parameters (ICP and coil platen, gases flows, pressure and reactor temperatures) on profiles, selectivity and uniformity.