UV-Curable Polymer Systems Tailored For UV-Nanoimprint Lithography − Needs And Developments

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There are two basic strategies for nanoimprint lithography: thermal nanoimprinting using thermoplastic or thermosetting polymers and UV-based nanoimprint lithography (UV-NIL). The interest in UV-NIL has been steadily increasing in recent years. UV-NIL is performed at room temperature different from thermal nanoimprinting. The use of liquid, low-viscous, and UV-curable polymeric materials allows short cycle times and low imprint pressures. Both characteristics are beneficial for the implementation of mass fabrication using imprinting technology.

The availability of suitable resists is one key element of UV-NIL. While numerous publications deal with various technical aspects like reproducibility, hard or soft molds, adhesion issues or alignment, only few data was published concerning the requirements to and features of specific UV-curable materials.[1−5]

In this contribution, a UV-curable polymer system is evaluated, which meet the requirements of liquid resist processing, application by spin-coating and wafer-scale imprinting. Important features are: (a) film thicknesses below 100 nm, (b) low viscosity for low residual layers, (c) very fast curing reaction, and (d) high plasma etch resistance. The UV-NIL material development is described and its characterisation in the UV-NIL process is presented.

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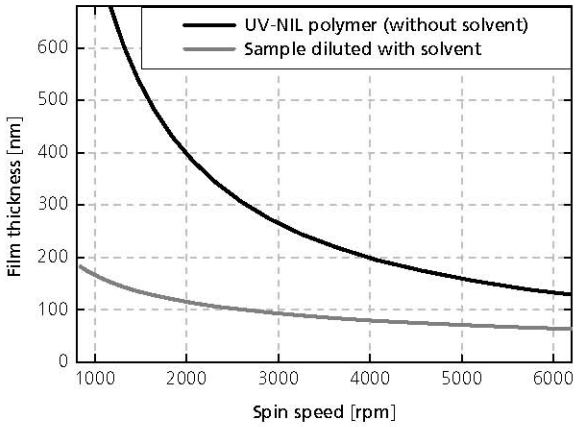

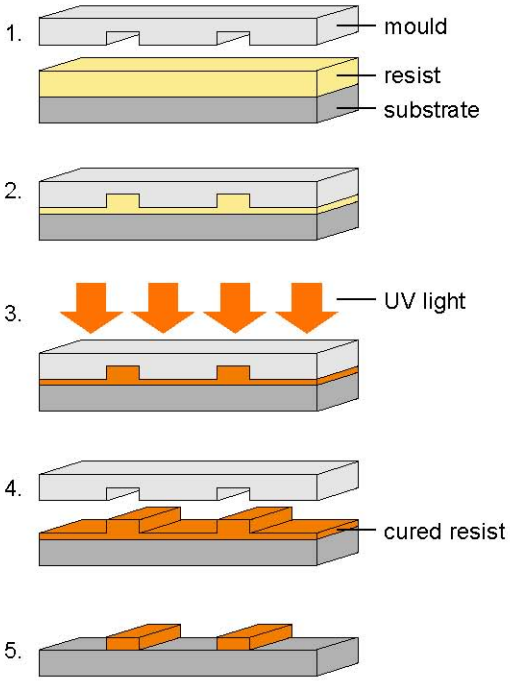

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