

Adhesion force measurement of various combination of UV-NIL stamp – resin

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In UV-NIL process the surface interaction between mold and resist with repeated molecularly clean separations of the mold from the newly cured resist is the basic requirement. In order to reduce the adhesive force between the mold and photo curable resin in UV-curable imprint lithography, various combinations of mold and resin materials were examined. Measurement methods for the relative adhesion force for mold materials and photo curable resins were established using tensile testing machine. H.M.PFPE based mold showed the least adhesion compared to PDMS and other rigid mold materials experimented. Use of functionalized perfluoro polymer as mold material eliminated the mold surface treatment step. In case of photo curable resin AMONIL resin showed the least surface energy again most mold material experimented, H.M.PFPE – AMONIL was found to be the best combination as UV-NIL mold – resin with adhesion force per unit area of the order of 20 KPa.