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Voice Coil Actuator as Adhesion Measurement Technique for Micro stereo lithography Components

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Abstract : Interfacial adhesion of UV curable polymers is important in Microstereolithography (MSL) due to the sticking problems during separation from their substrate and insuring adhesion between two dissimilar materials used in micro-fabrication. Therefore, standardizing quantitative ranking among different substrates helps to select the required substrate for fabrication of polymers according to their application. In this paper, a technique is proposed and used to perform experiment on interfacial adhesion of HDDA polymer over three different substrates: silicon, glass, and Teflon. A voice coil actuator with a pushing needle mechanism is modified to carry out experiments on interfacial adhesion of the polymer. The proposed technique has got additional advantage of removing micro-structures from their substrate without damaging the micro structure. Finally, interfacial adhesion of HDDA on Teflon, silicon, and glass is ranked according to the results obtained from the proposed technique.
Key Words : adhesion, curable polymers, micro stereo lithography, voice coil actuator.

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