

Feasibility Study of Wafer Scale Laser Assisted Thermal Imprinting of Glass Nanostructures

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ABSTRACT

Major challenges for any direct nanostructuring method on glass substrate is the difficulty to scale up the patterning area to industrial scale. In this work, a rapid and large area direct thermal imprinting of glass nanostructures using silicon mold assisted by CO₂ laser irradiation was demonstrated. Pattern transfer was successful for experiment trial of one spot laser irradiation and laser scanning with imprinting area of 100mm² and 400mm²; confirmed by SEM and AFM measurement. When the method was extended to a larger imprinting area (2000 mm²), the glass was cracked and partially imprinted due to the high cooling rate of the glass after laser irradiation and misalignment of the glass during the contact pressing step in our molding setup.

KEYWORDS: CO₂ laser, Thermal imprinting, Optical glass, Nanostructures

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