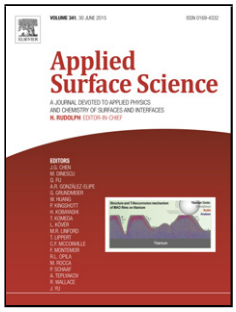

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LASER-INDUCED FORWARD TRANSFER OF HIGH-VISCOSITY SILVER PASTES

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Abstract

In this work, a study of the morphology of individual dots of silver paste deposited by laser-induced forward transfer (LIFT) is performed using a ns-pulsed laser at 532 nm. The LIFT process is characterized by scanning confocal microscopy on the deposited material and in-situ time-resolved imaging during the transfer in order to illuminate the flow dynamics in relation to the pulse energy and paste thickness. The influence of process parameters on the structure of transferred dots is explained both phenomenologically and analytically.

Depending on the experimental conditions, different transfer regimes were observed. These regimes have similarities to those reported for LIFT of Newtonian fluids and nanopastes, but the multiphase and non-Newtonian rheology and thicker films used lead to noticeable differences, such as the formation of a continuous and stable pillar connecting donor and acceptor substrates when the paste film is thick enough and the energy is optimum. This process regime allows transfer of dots with high aspect ratios, which is desirable for the printing of contacts on solar cells.

Keywords

Laser-induced forward transfer, Laser direct-write, Printing, Metallization