Laser Induced Forward Transfer (LIFT) printing of conductive and dielectric materials

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Laser-Induced Forward Transfer (LIFT) is a versatile technique, allowing the transfer of a wide range of materials, with no contact, and high accuracy. LIFT allows the use of inks, pastes, and even solid films, as the donor material [1]. It is a promising printing and metallization method for the PV industry. Also, the capability of print both metallic and insulating materials allows the deposition of different circuit elements as capacitors, resistors, or inductors [2].
Here we show a complete study on the deposition by LIFT of different materials (silver paste, cooper ink , graphene ink and ceramic oxide) (see figure 1). Finally, the metallization of PV solar cells by LIFT using a high-viscosity silver paste is presented [3] (see figure 2).

References

[1] Morales, M. et al, Laser-Induced Forward Transfer Techniques and Applications, Second Edi, Elsevier Ltd. (2018) 339
[2] Grant-Jacob, J. A. et al., Opt. Mater. Express 3, (2013) 747
[3] Canteli, D. et al., Results Phys.27 (2021) 104504

Figures

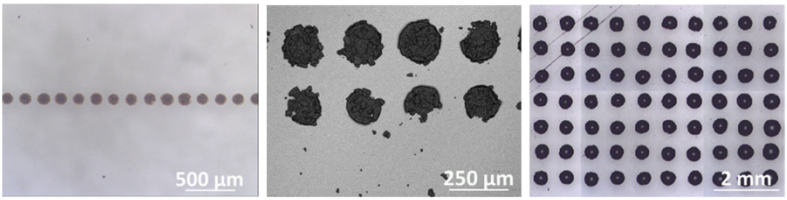

Figure 1: Confocal microscope images of voxels transferred by LIFT of a graphene ink (left), a ceramic oxide (centre) and a copper ink (right).

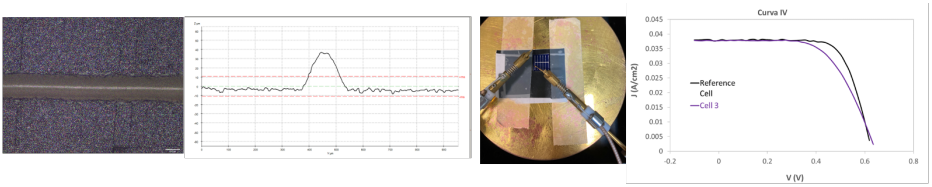

Figure 2: Silver paste line printed by LIFT (confocal image and section profile). Current density-voltage curves of the cells (measured using a solar simulator and four tips).