Laser-Induced Forward Transfer Layered Materials

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Abstract

Current technological trends require the precise deposition of highly resolved features, in a direct writing approach which preserve their structural and electronic properties upon transfer, while increasing the number of components that can be integrated in a single device. Over the past decade, printed electronics technology has evolved and is now used in applications such as flexible screens, intelligent labels and packaging. Among the printing techniques, Laser-induced forward transfer (LIFT) technique is capable of printing electrical circuits quite inexpensively and quickly. At the same time, this technique is environmentally friendly and has no restrictions in terms of viscosity. In this work we highlight the newest trends of LIFT manufacturing for the development of a variety of components including layered materials such as graphene with electronic, optoelectronic and sensing functionality such as RFID antennas, RF transmission lines, organic thin-film transistors, metallic interconnects, circuits defects repairing and biochemical sensors.

At the same time, the increasingly demanding requirements have highlighted the need of a more thorough, all-embracing research regarding the rheological characteristics of the printable fluids, their jetting dynamics and their electrical, post-sintering properties, that will define the process' reliability, aiming towards its industrialization