ATHENS -- National Technical University of Athens researchers have developed a way to print polymer circuits with lasers.

The approach is novel for its use of laser ablation instead of solvents to deposit a solid polymer directly onto a substrate.

The approach starts by creating a layer of the conducting polymer on a glass or quartz substrate. This layer is created by using the liquid form of the polymer and allowed to dry in the normal way. The substrate is then placed to face the layer of conducting polymer, with the two layers separated by a gap of a few micrometers.

Next, the laser is fired through the glass substrate, causing a small amount of the solidified polymer to detach from the glass, traverse the small gap, and attach onto the receiving substrate. The circuit is printed by moving the substrates during the process to create 2D patterns of the conducting polymer on the receiving substrate/

And because the polymer transfers as a solid, they avoid all the problems associated with solvents.

The process has been successfully tested by printing photovoltaic circuits of a conducting polymer called P3HT:PCBM onto various substrates. It has also been tested by printing biological sensing circuits using a conducting polymer called polyaniline.

Despite the obvious advantages of polymer circuits, many conducting polymers start off as liquid solutions with solvents. These solutions are then sprayed on to a substrate, or printed via inkjet techniques. Solvents can limit the application of polymer circuits, however, since they can affect electronics layers under the circuits by dissolving them. And the polymers are affected by the drying mechanism, which causes them to clump up at the edges of a droplet as it dries.

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