

Laser Scribing of Graphene Oxide Yielding Multipurpose Stamped Nano Films

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We have developed a new method for the fabrication and easy patterning of flexible exfoliated graphene nano films for different applications. This technique allows the transfer of conductive laser scribed rGO films onto almost any substrate (PET, paper, nitrocellulose, glass, fabric, silicon, skin, etc.). Combining high resolution laser annealing with the stamping method, isolated rGO films up to 30nm thick with a conductivity of 10^2 S/m were produced in a three-step process: filtering the graphene oxide (GO) solution through nitrocellulose membrane, reduction of GO surface using laser and transfer of the resulting rGO pattern onto a new substrate via pressure-based mechanism. This technique was tested for sensing and biosensing applications, as back electrodes for electroluminescent lamps and touch sensors where it proved to offer better performance compared to other commonly used materials. Furthermore, since it is a stamping procedure, the substrate is not affected by any solvent or temperature, which increases its usability. [1]

References

- [1] Giacomelli, C., Álvarez-Diduk, R., Testolin, A., Merkoçi, A, *2D Materials*, (2020), doi.org/10.1088/2053-1583/ab68a7

Figures

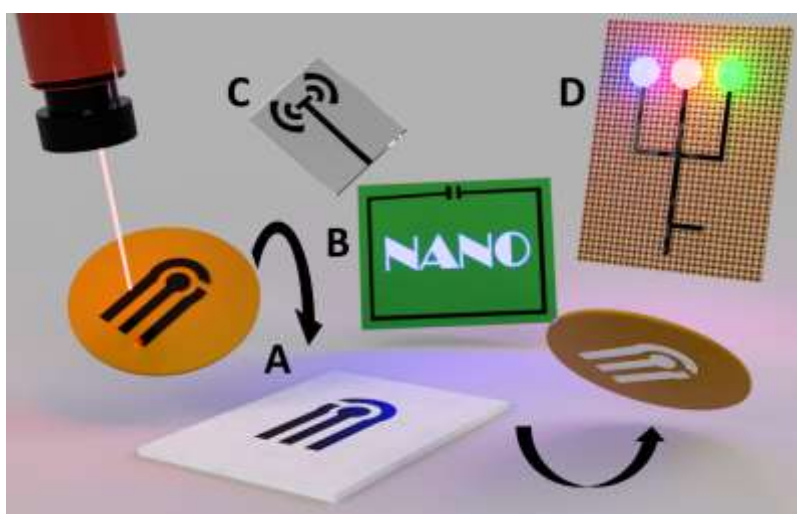


Figure 1. Schematic representation of the technique and developed devices. Laser scribed rGO is transferred onto a substrate leaving the remains of GO in the membrane. Examples of the stamping process onto different materials (A) Paper based electrode, (B) Electroluminescent lamp, (C) Proximity and touch sensor on PET, (D) 3D circuits on fabric.