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Fabrication of Graphene-based Flexible Devices Utilizing Soft Lithographic Patterning Method

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In this study, we demonstrated that the soft lithographic patterning processing of chemical vapor deposition (CVD) graphene and rGO sheets as large scale, low cost, high quality and simplicity for future industrial applications. Recently, a previous study has reported that single layer graphene grown via CVD was patterned and transferred to a target surface by controlling the surface energy of the polydimethylsiloxane (PDMS) stamp [1]. Using this approach, the surface of a relief-patterned elastomeric stamp was functionalized with hydrophilic dimethylsulfoxide (DMSO) molecules to enhance the surface energy of the stamp and to remove the graphene-based layer from the initial substrate and transfer it to a target surface [2]. Further, we developed a soft lithographic patterning process via surface energy modification for advanced graphene-based flexible devices such as transistors or simple and efficient chemical sensor consisting of reduced graphene oxide (rGO) and a metallic nanoparticle composite. A flexible graphene-based device on a biocompatible silk fibroin substrate, which is attachable to an arbitrary target surface, was also successfully fabricated.

References

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