Laser-Induced Graphene substrates: electrical, structural and biological characterization for biomedical applications

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Laser-Induced Graphene (LIG) has emerged as a promising two-dimensional material for biomedical applications due to its high electrical conductivity, tunable surface properties, and biocompatibility. In this work, LIG substrates were fabricated from commercial polyimide (PI) via laser photoablation, systematically varying key processing parameters such as laser power, scan speed, and pattern design to achieve controlled physicochemical and structural properties [1].
A comprehensive characterization of the resulting substrates was carried out, including electrical measurements, surface morphology and roughness analysis, as well as wettability assessment through contact angle measurements. In addition, *in vitro* biological assays were performed to evaluate cell-substrate interactions [2,3].
The results demonstrate that LIG substrates can be reproducibly fabricated with tailored surface morphologies and suitable electrical performance. Importantly, these substrates exhibited good biocompatibility, supporting cellular adhesion and guiding cell growth, with surface topography playing a key role in modulating cellular behavior [4].
Overall, these findings highlight the potential of LIG as a versatile and tunable platform for the development of advanced biointerfaces, paving the way for future applications in bioelectronics, tissue engineering, and biomedical devices.

Keywords:
Laser-Induced Graphene (LIG); biointerfaces; wettability; contact angle hysteresis; surface roughness; graphene-based materials; cell–substrate intera

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Acknowledgements:
This work is part of the research project P20, Pre-competitive Research Project Program for Young Researchers, Modality B of the 2024 research plan (reference PPJIB2024-78). The authors acknowledge financial support from the Universidad de Sinaloa (Mexico) through SECIHTI. The authors also thank the Pervasive Electronics Advanced Research Laboratory (PEARL) and the Cell Biology Laboratory of the University of Granada, as well as Biothera-Lab, for their technical support and access to experimental facilities.