Integration of laser-induced graphene with silicon based microdevices

Iñigo Martin-Fernandez[1]
Oriol Calero[2], Joaquin Santander[1], Marc Salleras[1], Luis Fonseca[1]
[1] *Institute of Microelectronics of Barcelona (IMB-CNM), CSIC, Campus UAB, Bellaterra, Spain*
[2] *Autonomous University of Barcelona (UAB), Campus UAB, Bellaterra, Spain*
inigo.martin@imb-cnm.csic.es

Laser-Induced Graphene (LIG), has emerged as a technique to grow porous graphene with precise control over the patterned structures and with reduced experimental costs. [1] The most extended fabrication is based on a photothermal conversion of a polyimide foil when scribing with a CO_2 laser. Other polymer sources such as lignin have been demonstrated. [2] LIG is electrically conductive and has a high specific surface area, which have been mostly explored for sensors and energy devices on the starting polymeric substrates. At this time, however, few works relate to LIG combined with microdevice technologies and to the related application opportunities. [3] This contribution will summarise the ongoing results on the patterning of LIG on silicon-compatible substrates and on its integration on microdevices, including the deposition of polyimide, the laser scribing parameters and considerations for the integration with some MEMS device.

Acknowledgements: financial support from the European Union's Horizon 2020 research and innovation programme (GA. 824072), from the TRIGGER call by IMB-CNM(CSIC) and from grant RYC2022-037016-I funded by MCIN/AEI/ 10.13039/501100011033 and by ESF+.

References

[1] Z. Zhang et al., Carbon 214(2023)118356
[2] M. Navarro-Segarra et al. (submitted)
[3] JL Beckham et al., ACS Nano 15 (2021) 8976–8983

Figures

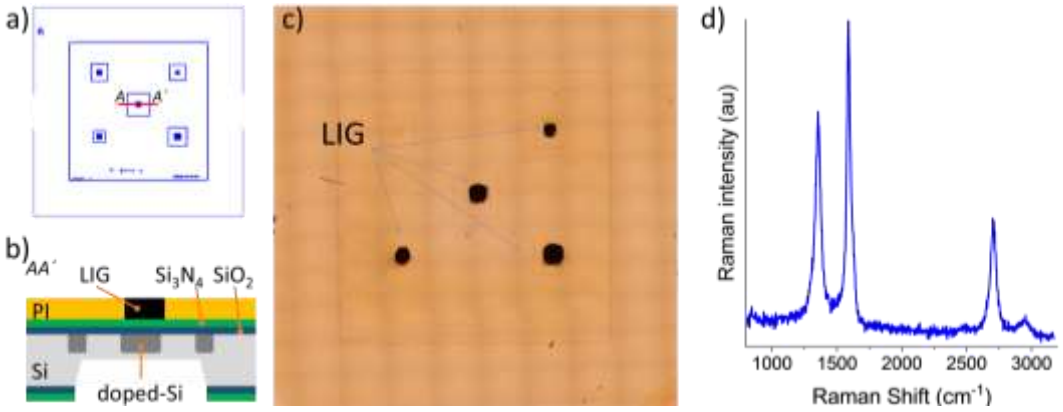

Figure 1: Growth of LIG on a silicon-based microdevice. a) layout of the Si chip. b) Schematic of the layer structure in section AA' in (a). c) Optical image of a 1.5 cm x 1.5 cm chip where LIG was selectively patterned at the membrane areas. d) Raman spectrum of the patterned LIG.