Optothermal Raman Spectroscopy of 2D materials on metal substrates.

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Two-dimensional layered semiconductors are promising candidates for applications in electronics and optoelectronics. For an effective exploitation of their functional properties, it is also important to understand their thermal behavior. An important issue is how to measure their heat diffusion properties, especially when they are in contact with different materials, such as insulators or metal interconnects. In this work we use Raman spectroscopy to investigate how the laser-induced heat affects the phonon modes at the interface by comparing the experimental data with a finite element simulation of a localized heat diffusion, trying to also tackle the measurement of the interface thermal resistance at the nanoscale. The case studies presented are the heat dissipation on Au-supported black phosphorus nanosheets and Ag-supported silicene and silicene/stanene stacks.[1,2]

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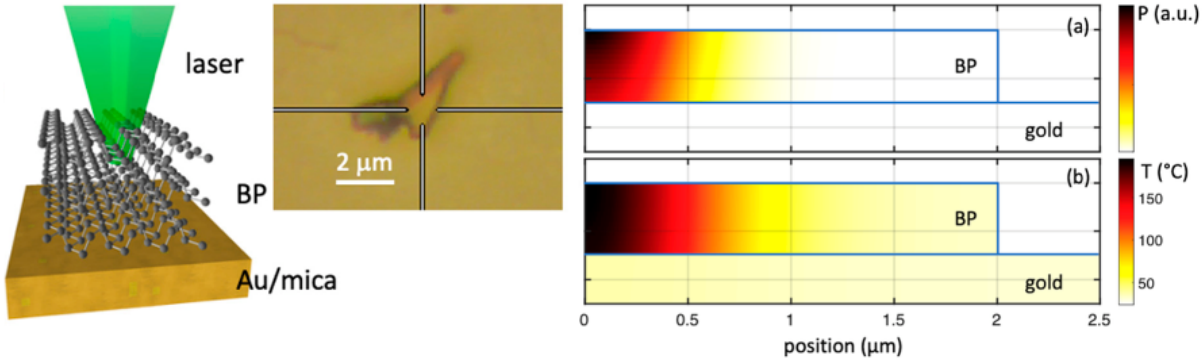

Fig. 1. From left to right: sketch of the4 experiment, optical microscopy of a flake, simulation of the focal field and the temperature, adapted from [1].

[1]E. Bonera and A. Molle, Nanomaterials **12**, 1410 (2022)
[2] C. Martella, C. Massetti, D. S. Dhungana, E. Bonera, C. Grazianetti, A. Molle, Adv. Mat. (2023), preprint available with DOI 10.1002/adma.202211419