Thermal properties of Xenes measured by optothermal Raman spectroscopy.

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After the outcomes on graphene, Xenes like phosphorene, silicene, and stanene layers, as well as their epitaxial heterostructures, introduced novel advancements in two-dimensional (2D) materials science and nanotechnology.[1] With all these materials being promising for application to electronics and optoelectronics, an issue remains as to how heat diffusion is managed when they are subjected to thermal dissipation of heat. The problem is also related to the dissipation from Xenes towards the substrate or to metal contacts.
Here, using an optothermal method based on Raman spectroscopy as non-destructive probe, we explore the effective thermal conductivity of phosphorene and silicene on different substrates.[2-3] The so-proposed approach discloses a viable route for the assessment of the thermal properties of silicene and other supported 2D materials. The management of power dissipation at the nanoscale could eventually be exploited in fields like thermoelectrics. We believe that our work provides a new perspective on an unresolved nanoscale issue such as the thermal response of classes of 2D materials, enabling significant advances in the field of the heat management. [MUR-Prin Photo]

References

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