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Monoelemental 2D Materials-based Field Effect Transistors for Sensing and Biosensing: Phosphorene, Antimonene, Arsenene, Silicene, and Germanene go beyond Graphene

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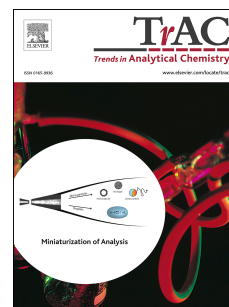
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Monoelemental 2D Materials-based Field Effect Transistors for Sensing and Biosensing: Phosphorene, Antimonene, Arsenene, Silicene, and Germanene go beyond Graphene

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Abstract

Graphene has been of immense interest for its interesting electronic properties, such as being a zero-band gap semiconductor. However, to be able to usefully employ graphene for electronics and electronic-transduction system sensors and biosensors, one needs to open this band gap. This proves to be challenging on a reproducible, scalable way. There are other 2D monoelemental materials that exhibit useful band gap and which can be used for field effect transistor- (FET-) based sensing and biosensing. Here we discuss trends in the development of FET-based sensors utilizing 2D phosphorene, arsenene, antimonene, silicene, and germanene.

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