Germanane: a versatile member of the family of 2D materials

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Abstract

Two-dimensional van der Waals materials have shown great promise for a variety of electronic, optoelectronic, sensing, and energy conversion applications. Here I shall focus on Germanane (GeH) and first illustrate a new and facile approach that allows to obtain the final product in just a few minutes. The GeH produced with this method is highly pure and thermally stable. When used as active material in a FET, it shows bipolar behavior like graphene. GeH turns metallic upon heating when hydrogen desorbs. In addition to being attractive for (opto)electronic applications, GeH monolayer films also serve as antibacterial coatings. We also showed that germanane and the novel butyl-functionalized germanane can be used as photocatalysts for water purification under visible light irradiation.

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