

Layered materials beyond graphene – new possibilities and applications

Zdeněk Sofer

Department of Inorganic Chemistry, University of Chemistry and Technology Prague, Technická 5, 166 28 Prague 6, Czech Republic

Beyond graphene, which is intensively studied over more than one decade, the other related materials remain almost unexplored. The research activities in the field of other layered materials like phosphorene, arsenene, silicene and germanene are rapidly growing in the last few years. Compare to graphene, all these materials are non-zero band-gap semiconductors. This property opens new application possibilities in electronic and optoelectronic devices. The properties of 2D materials can be further controlled by their functionalization. The chemistry of materials beyond graphene is not explored and shows high application potential in many fields. Compare to the graphene and pnictogen group, the chemical exfoliation method must be applied for synthesis of silicene / germanene derivatives using Zintl phase compounds like CaGe_2 and CaSi_2 . Various methods well know from organic chemistry can be applied for synthesis of tetrel derivatives reaching almost complete derivatization of 2D material skeleton.