Inorganic Graphene Analogues: Recent Results

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Graphene has been a sensational discovery of recent years. In the last two to three years, there has been effort to prepare graphene-like layered inorganic materials such as MoS_2, WS_2, GaS and BN. Several methods of synthesis of such nanosheets have been developed.[1,2] Some of the recent results on few-layer metal chalcogenides and BN will be presented. Specially interesting are the physical properties of these nano materials such as magnetism and superconductivity.[3] Transistors and devices have been fabricated with many of the layered inorganic materials.[2,3] A new graphene-like material is $B_xC_yN_z$ with high surface area and novel gas adsorptive properties. These materials have other extraordinary properties, their use as electrocatalysts being specially noteworthy.[4] Specially noteworthy are the novel materials obtained by cross linking MoS_2 with other 2D materials or by functionalizing MoS_2 sheets.[5,6] Thus, interaction of electron donor and acceptor molecules has unraveled the electronic structure and properties of phospherene. Covalent cross-linking C_3N_4 and MoS_2 favors photochemical splitting of water.

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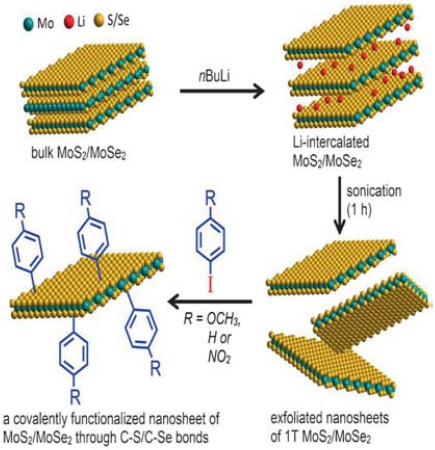

Fig.1. Schematic illustration of the functionalization of nanosheets of 1T-MoS, and 1T-$MoSe_2$ with para-substituted iodobenzenes.

Keywords: MoS_2, 2D-Materials, C_3N_4, Hydrogen/evolution reaction

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