

Название публикации:

Quasi-two-dimensional transition metal dichalcogenides: Structure, synthesis, properties, and applications

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Сведения об издании:

Physics-Uspekhi

Volume 61, Issue 1, 2018, Pages 2-28

Аннотация:

Electron states in quasi-two-dimensional (2D) metal and semiconductor crystals can have unusual characteristics and can therefore exhibit unusual electronic and optical properties. In this paper, the results recently obtained for a new class of 2D compounds-transition metal dichalcogenides-are presented, including those on the structure, preparation methods, the electronic, mechanical, and optical properties, defects and their influence on material properties, and conditions facilitating the formation of defects. We consider the unique properties of mono- and multilayer materials, examine their dependence on external factors, and discuss their further application prospects. Various applications of 2D transition metal dichalcogenides are described, ranging from nanolubricants, nanocomposites, biosensors, memory cells and supercapacitors to optoelectronic, spin, and photovoltaic devices. © 2018 Uspekhi Fizicheskikh Nauk, Russian Academy of Sciences.

Ключевые слова:

Defects, Electronic and optical properties, Heterostructures, Spin polarization, Transition metal dichalcogenides, Two-dimensional structures, Valleytronics