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Two-Dimensional Materials and Their Exotic Electronic Properties

Guest Editors:

Prof. Dr. Jiatao Sun

School of Integrated Circuits and Electronics, Beijing Institute of Technology, Beijing, China

Dr. Huixia Fu

College of Physics, Chongqing University, Chongqing, China

Deadline for manuscript submissions:
closed (20 August 2022)

Message from the Guest Editors

Since the discovery of graphene in 2004, two-dimensional (2D) materials have become one of the largest research fields in the scientific community. This is not only due to their intriguing fundamental physical properties, including magnetism, topology, superconductivity, etc., but also their potential applications in catalysts, ferroelectricity, spintronics, valleytronics, twistrionics, etc.

However, large-area synthesis, defect and interface interference, delamination and peeling, etc. are remaining bottlenecks for widespread applications of 2D materials. Beyond the widely studied graphene and transition metal dichalcogenides (TMDs), few kinds of 2D materials have been discovered, including dielectric, MXenes, covalent organic frameworks (COFs), BiOX, etc. High throughput calculations combined with materials informatics accelerates the discovery of new 2D materials.

The aim of this SI is to introduce the current progress of 2D materials, to explore more 2D materials with exotic electronic properties, and to further promote the potential applications of devices based on 2D materials.

Prof. Dr. Jiatao Sun

Dr. Huixia Fu

Guest Editors



mdpi.com/si/100298



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1. Department of Biomedical Engineering, Faculty of Medicine and Health Sciences, McGill University, Montreal, QC H3A 2B6, Canada

2. Faculty of Dentistry and Oral Health Sciences, McGill University, 3640 Rue University, Montreal, QC H3A 0C7, Canada

Prof. Dr. Yuguang Ma

State Key Laboratory of Luminescent Materials and Devices, South China University of Technology, Guangzhou 510640, China

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Contact Us

Materials Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland

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