Editorial

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2D Xenes: from fundamentals to applications

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Since the seminal work reporting the isolation of atomically thin graphene was published in 2004, researchers from different fields have joined together to explore the new physics and potential applications of 2D materials. In recent years, the 2D materials library has not stopped growing with their stoichiometry rapidly expanding from single elements (e.g., C, Si, Ge, P, Te, and Bi) to compounds (MoS_2, Bi_2Se_3, and Ti_3C_2). Moreover, heterostructures and superlattices of 2D materials have opened a new realm in materials science, offering unprecedented possibilities. These investigations have, *de facto*, benefited the development of basic scientific research, daily life, military defense, and many other areas.

In this special issue, we have collected the most pioneering research work and prospective viewpoints in the 2D material multidiscipline community. There is no doubt that warm feedback was received on announcement of this special issue focusing on "2D Xenes". We are grateful to have received so many excellent manuscripts from leading research groups and this has far exceeded our expectations. Therefore, we had to select the most suitable ones for this special issue and reluctantly reject others.

The contributing authors from different backgrounds were asked to give their respective points of view when exploring the most recent phenomena relating to 2D Xenes, pushing the performance of related devices to the limit. Clear experimental data interpretation and physical mechanism explanations were required and have been presented in this special issue.

In this special issue, the authors discussed basic theory predictions [1], photon-carrier interactions [2], cutting-edge material fabrication techniques [3, 4], and diverse applications, such as optical modulators [5, 6], high-sensitive detector schemes [7, 8], 2D photonic memristors [9] and so forth. To give a clear classification for the readers, this collection is described as "Fundamentals" and "Applications".

To further advance this field, several hurdles need to be crossed. These included; large-scale high quality 2D materials fabrication, basic research and manipulation of many-body effects and quantum entanglement in the 2D nano-platforms, as well as the gap-bridging between theoretical predictions and experimental results. Yet, solving these problems also unearthed massive opportunities and provided a great deal of pleasure. This special issue hopes to summarize the state-of-the-art progress and emerging opportunities in the 2D Xene community and pave the way for next-generation nano-technologies and applications.

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