Special Issue

Catalytic Applications for 2D Materials under the Modulations of Symmetry

Message from the Guest Editor

Increasing global environmental pollution and the energy crisis are two key challenges we are facing, and energy conversion and renewable technologies with less toxic emissions are highly desirable to achieve a sustainable energy future. Recently, 2D materials have been suggested as promising substrates for the purpose of catalytic applications due to them having high symmetry; the material symmetry can directly determine the possible active site position. Moreover, there are various types of surface defects in 2D nanomaterials, including surface atomic mismatch, surface polarization, surface amorphization, surface doping and impurity adsorption, surface vacancies, and composite vacancies. These defects will reduce the symmetry of 2D materials, and have an important impact on their electronic structure, spectral absorption, the excitation, migration, and recombination of photogenerated electron holes, affecting their catalytic performance. Therefore, the symmetry of 2D materials provides an additional dimension for understanding and regulating catalytic performance.

Guest Editor

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Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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