

## Preface

In materials science, the term single-layer materials or 2D materials refers to crystalline solids consisting of a single layer of atoms. These materials are promising for some applications but remain the focus of research. Single-layer materials derived from single elements generally carry the -ene suffix in their names, e.g. graphene. Single-layer materials that are compounds of two or more elements have -ane or -ide suffixes. 2D materials can generally be categorized as either 2D allotropes of various elements or as compounds (consisting of two or more covalently bonding elements).

It is predicted that there are hundreds of stable single-layer materials. The atomic structure and calculated basic properties of these and many other potentially synthesisable single-layer materials, can be found in computational databases. 2D materials can be produced using mainly two approaches: top-down exfoliation and bottom-up synthesis. The exfoliation methods include sonication, mechanical, hydrothermal, electrochemical, laser-assisted, and microwave-assisted exfoliation.<sup>i</sup>

In the present book, thirteen typical literatures about 2D materials and applications published on international authoritative journals were selected to introduce the worldwide newest progress, which contains reviews or original researches on 2D materials and applications. We hope this book can demonstrate advances in 2D materials and applications as well as give references to the researchers, students and other related people.

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<sup>i</sup> [https://en.wikipedia.org/wiki/Single-layer\\_materials](https://en.wikipedia.org/wiki/Single-layer_materials)