

Preface

In this short book, we introduce the application of computational homology for structure analysis of metallic glasses. Metallic glasses, relatively new materials in the field of metals, are the next-generation structural and functional materials owing to their excellent properties. Understanding the properties and developing novel metallic glass materials will require uncovering their atomic structures, which, unlike crystals, have no periodicity. Although numerous experimental and simulation studies have been performed to reveal these structures, it is extremely difficult to perceive a relationship between structures and properties without the appropriate viewpoint. Our purpose is to show how our new approach using computational homology provides useful insight into the interpretation of the atomic structures. It is noted that computational homology is now widely applied to various data analyses. We start with a basic, brief survey of metallic glasses and computational homology and then move on to the detailed procedures and interpretation of analyses based on computational homology for metallic glasses. The authors are grateful to T. Fujita and P.F. Guan for providing structural models of metallic glasses.

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Computational Homology

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