Graphene-Like Monolayer Low-Buckled Honeycomb Germanium Film

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Graphene-Like Monolayer Low-Buckled Honeycomb Germanium Film

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Abstract

Molecular dynamics simulations have been performed to study the cooling process of two-dimensional liquid germanium under nanoslit confinement. The results clearly indicates that the liquid germanium undergoes an obvious liquid-solid phase transition to a monolayer honeycomb film with the decrease of temperature, accompanying the rapid change in potential energy, atomic volume, coordination number and lateral radial distribution function. During the solidification process, some hexagonal atomic islands first randomly emerge in the disordered liquid film and then grow up to stable crystal grains which keep growing and finally connect together to form a honeycomb polycrystalline film. It is worth noting that the honeycomb germanium film is low-buckled, quite different from the planar graphene.

1. Introduction

In the last decade, two-dimension (2D) material has attracted remarkable world-wide attention for its fascinating properties and nearly infinite applications, ever

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