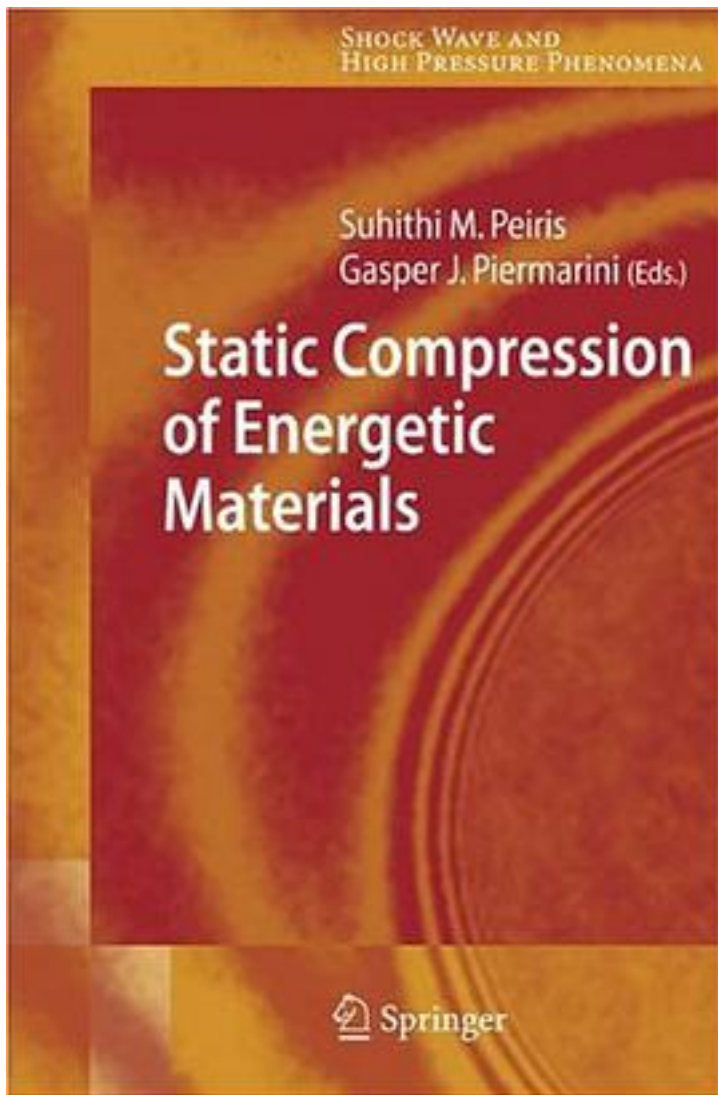


Static Compression of Energetic Materials



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Developing and testing novel energetic materials is an expanding branch of the materials sciences. Reaction, detonation or explosion of such materials invariably produce extremely high pressures and temperatures. To study the equations-of-state (EOS) of energetic materials in extreme regimes both shock and static high pressure studies are required. The present volume is an introduction and review of theoretical, experimental and numerical aspects of static compression of such materials. Chapter 1 introduces the basic experimental tool, the diamond anvil pressure cell and the observational techniques used with it such as optical microscopy, infrared spectrometry and x-ray diffraction. Chapter 2 outlines the principles of high-nitrogen energetic materials synthesis. Chapters 3 and 4, examine and compare various EOS formalisms and data fitting for crystalline and non-crystalline materials, respectively. Chapter 5 details the reaction kinetics of detonating energetic materials. Chapter 6 investigates the interplay between static and dynamic (shock) studies. Finally, Chapters 7 and 8 introduce numerical simulations: molecular dynamics of energetic materials under either hydrostatic or uni-axial stress and ab-initio treatments of defects in crystalline materials. This timely volume meets the growing demand for a state-of-the art introduction and review of the most relevant aspects of static compression of energetic materials and will be a valuable reference to researchers and scientists working in academic, industrial and governmental research laboratories.

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目录:

[Static Compression of Energetic Materials_下载链接1](#)

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