

## Preface

“Textbooks and Heaven only are Ideal;  
Solidity is an imperfect state.  
Within the cracked and dislocated Real  
Nonstoichiometric crystals dominae.  
Stray Atoms, sully and precipitate;  
Strange holes, excitons, wander loose; because  
of Dangling Bonds, a chemical Substrate  
Corrodes and catalyzes—surface Flaws  
Help Epitaxial Growth to fix adsorptive claws.”

“The Dance of the Solid,” John Updike.

This book is a record of our engagements with “the shock-induced chemical ballet of the solid” that has fascinated us over the period of almost two decades. The prospect of holding a new substance or a substance with unique microstructure that is not produced by Mother Nature has been an addictive charm. One of our main objectives of writing this book is to gather our work and our colleagues together to see some coherent structure or themes in the burgeoning field of shock compression chemistry with special focus on inorganic materials.

Although the book contains discussions on selected fundamentals of shock compression of solids, they are not meant to be reviews nor pedagogical discussions. They are included as part of the bases of shock chemistry. Also, they are the well travelled roads that one must pass to reach the borderland of the unknown. The selection and organization of topics is strongly influenced by such factors as our interests and perceptions, historical circumstances, and the page limitation. The book is a study in theory and application organized to detect the coherence of the phenomena of shock compression chemistry.

Discussions of the chemistry of materials are mostly found in applications. Theories are concerned with selected aspects of high pressure shock compression of solids and the effects on chemical reactions on shock wave propagation. Chapter Six is in some sense an attempt to merge the two on the macroscopic level. But the chemistry is rudimentary, if not embryonic. The quantitative understanding of materials chemistry under the extreme conditions of high pressures and high temperatures is a fundamental problem that needs to be challenged in the future.

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