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Nota di contenuto	Part I: High-energy chemistry and processing of metals -- 1. Laser-induced bubble generation on excitation of gold nanoparticles -- 2. Metal and alloy nanoparticles formed by laser-induced nucleation method -- 3. Laser-induced reduction and particle formation of precious metal ions in a solution: Application to metal recovery -- 4. Synthesis of metal nano-particles induced by plasma-assisted electrolysis -- 5. Controllable surface modification of colloidal nanoparticles using laser ablation in liquids and its utilization -- Part II: High-energy processing of nonmetals -- 6. Fabrication and control of semiconductor random lasers using laser processing techniques -- 7.

Formation mechanism of spherical submicrometer particles by pulsed laser melting in liquid -- 8. Mass production of spherical submicrometer particles by flow-style pulsed laser melting in liquid -- 9. Material processing for colloidal silicon quantum dot formation -- 10. Processing of transparent materials using laser-induced high-energy state in liquid -- 11. Functional nanomaterial and nanostructure synthesized by femtosecond laser pulses -- 12. Preparation of functional nanoparticles by laser process in liquid and their optical applications -- Part III: High-energy chemistry of nonmetals -- 13. Nanoscale transient laser heating and the related chemical process of organic solid -- 14. Fundamentals and applications of novel high-energy reaction fields by microwave chemistry -- 15. Study on the preparation and photocatalytic activity of the laser modified photocatalysis -- 16. Control of crystallization by intense focused laser beam -- 17. Electrocatalysts developed from ion-implanted carbon materials -- 18. Carbon nanoparticle production in plasma filaments generated by intense femtosecond laser pulses.

Sommario/riassunto

This book focuses on chemical reactions and processing under extreme conditions—how materials react with highly concentrated active species and/or in a very confined high-temperature and high-pressure volume. Those ultimate reaction environments created by a focused laser beam, discharges, ion bombardments, or microwaves provide characteristic nano- and submicron-sized products and functional nanostructures. The book explores the chemistry and processing of metals and non-metals as well as molecules that are strongly dependent on the energy deposition processes and character of the materials. Descriptions of a wide range of topics are given from the perspective of a variety of research methodologies, material preparations, and applications. The reader is led to consider and review how a high-energy source interacts with materials, and what the key factors are that determine the quality and quantity of nanoproducts and nano-processing.