

1. Record Nr.	UNINA9910136545903321
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Titolo	Nanothermites // Eric Lafontaine, Marc Comet
Pubbl/distr/stampa	Hoboken, New Jersey : , : ISTE Ltd/John Wiley and Sons Inc, , 2016
ISBN	1-119-33018-1 1-119-33020-3 1-119-32994-9
Descrizione fisica	1 online resource (349 p.)
Collana	Nanoscience and nanotechnology series
Disciplina	671.3/7
Soggetti	Thermit Metal powders Nanoparticles
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di contenuto	Cover; Title Page; Copyright; Contents; Introduction; 1: Elaboration of Nanoparticles; 1.1. Solid-phase elaboration; 1.1.1. Mechanical milling; 1.1.1.1. Principle; 1.1.1.2. The main types of mills; 1.1.1.3. Milling parameters; 1.1.1.4. Mechanosynthesis; 1.1.1.5. Conclusion; 1.2. Liquid-phase elaboration; 1.2.1. Sonochemistry; 1.2.1.1. Principle; 1.2.1.2. Effects of implementation parameters; 1.2.1.2.1. Power of emission; 1.2.1.2.2. Frequency of emission; 1.2.1.2.3. Amplitude of emission; 1.2.1.2.4. Duration of emission; 1.2.1.2.5. Impact of solvent; 1.2.1.3. Conclusion 1.2.2. Microemulsion synthesis 1.2.2.1. Definition; 1.2.2.2. Preparation of nanoparticles; 1.2.2.3. Mechanisms involved; 1.2.2.4. Influence of implementation parameters; 1.2.2.4.1. Concentration of surfactant; 1.2.2.4.2. Nature of surfactant; 1.2.2.4.3. Reaction rate; 1.2.2.5. Conclusion; 1.2.3. Solvothermal syntheses; 1.2.3.1. Principle; 1.2.3.2. Effect of temperature; 1.2.3.3. Effect of precursor concentration; 1.2.3.4. Effect of surfactant presence; 1.2.3.5. Effect of pH; 1.2.3.6. Effect of solvent; 1.2.3.7. Effect of anion; 1.2.3.8. Effect of duration; 1.2.3.9. Microwave-assisted synthesis 1.2.3.10. Conclusion 1.2.4. Sol-gel syntheses; 1.2.4.1. Principle; 1.2.4.2. Influence of operating conditions; 1.2.4.2.1. Effect of

temperature; 1.2.4.2.2. Effect of solvent; 1.2.4.2.3. Effect of pH; 1.2.4.2.4. Effect of salt addition; 1.2.4.2.5. Effect of surfactant; 1.2.4.3. Conclusion; 1.3. Gas-phase elaboration; 1.3.1. Condensation in inert gas; 1.3.1.1. Principle; 1.3.1.2. Influence of operating conditions; 1.3.1.3. Conclusion; 1.3.2. Explosion of metal wires; 1.3.2.1. Principle; 1.3.2.2. Influence of operating conditions; 1.3.2.2.1. Effect of pressure; 1.3.2.2.2. Effect of gas nature 1.3.2.3. Passivation 1.3.2.4. Conclusion; 1.3.3. Thermal plasma synthesis; 1.3.3.1. Direct current (DC) and low frequencies (AC) discharges; 1.3.3.1.1. Blown arc plasma in direct current; 1.3.3.1.2. Transferred arc plasma; 1.3.3.2. RF plasma; 1.3.3.2.1. RF inductively coupled plasma; 1.3.3.2.2. RF capacitively coupled plasma; 1.3.3.3. Microwave discharge plasmas; 1.3.3.4. Thermal plasma in solution; 1.3.4. Laser ablation; 1.3.4.1. Long pulse; 1.3.4.2. Ultrashort (picoseconds and femtoseconds) pulses; 1.3.4.3. Plasma expansion under vacuum or low pressure; 1.3.4.4. Laser ablation in liquids 1.3.4.5. Effect of laser parameters 1.3.4.5.1. Effect of number of pulses; 1.3.4.5.2. Effect of pulse duration; 1.3.4.5.3. Effect of wavelength; 1.3.4.5.4. Effect of fluence; 1.3.4.5.5. Effect of gas pressure; 1.3.4.5.6. Effect of solvent nature; 1.3.4.5.7. Effect of surfactants; 1.3.4.5.8. Effect on colloids in suspension; 1.3.4.6. Conclusion; 1.3.5. Pyrotechnic synthesis; 1.3.5.1. Detonation synthesis; 1.3.5.2. Deflagration synthesis; 1.3.5.3. Combustion synthesis; 1.3.5.4. Conclusion; 2: Methods for Preparing Nanothermites; 2.1. Introduction; 2.2. Physical mixing; 2.2.1. Mixing in hexane 2.2.2. Mixing in isopropanol

Sommario/riassunto

"The recent introduction of the nano dimension to pyrotechnics has made it possible to develop a new family of highly reactive substances: nanothermites. These have a chemical composition that is comparable to that of thermites at submillimeter or micrometric granulometry, but with a morphology having a much increased degree of homogeneity. Their reactivity can be specifically defined by playing with the numerous parameters offered by nanomaterial engineering (particle size, degree of homogenization of reactive phases, addition of gas generating agents, etc.), which opens up immense prospects for applications in the pyrotechnic systems of the future. This book discusses the methods of preparation of these energetic nanomaterials, their specific properties, and the different safety aspects inherent in their manipulation."
