

1. Record Nr.	UNINA9910953727103321
Autore	Khina B. B (Boris B.)
Titolo	Combustion synthesis of advanced materials // B.B. Khina
Pubbl/distr/stampa	New York, : Nova Science Publishers, c2010
ISBN	1-61324-254-9
Edizione	[1st ed.]
Descrizione fisica	1 online resource (124 p.)
Collana	Chemistry research and applications series
Disciplina	620.1/43
Soggetti	Self-propagating high-temperature synthesis Refractory materials - Heat treatment Refractory materials - Mathematical models
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. [93]-103) and index.
Nota di contenuto	Intro -- COMBUSTION SYNTHESIS OF ADVANCED MATERIALS -- COMBUSTION SYNTHESIS OF ADVANCED MATERIALS -- DEDICATION -- CONTENTS -- PREFACE -- Chapter 1 ADVANCES AND CHALLENGES IN MODELING COMBUSTION SYNTHESIS -- 1.1. APPROACHES TO MODELING NON-ISOTHERMAL INTERACTION KINETICS DURING CS -- 1.2. BRIEF REVIEW OF DIFFUSION-BASED KINETIC MODELS OF CS -- Chapter 2 MODELING DIFFUSION-CONTROLLED FORMATION OF TIC IN THE CONDITIONS OF CS -- 2.1. INTRODUCTION -- 2.2. SCENARIO 1: GROWTH OF S TIC CASE ON THE TITANIUM PARTICLE SURFACE -- 2.3. SCENARIO 2: GROWTH OF A TIC LAYER ON THE SURFACE OF SOLID CARBON PARTICLES -- 2.4. DIFFUSION DATA FOR TIC -- 2.5. TEMPERATURE OF THE REACTION CELL IN THE SHS WAVE -- 2.6. ADIABATIC HEAT RELEASE IN THE REACTION CELL -- 2.7. MODELING OF TIC LAYER GROWTH ON THE TITANIUM PARTICLE SURFACE -- 2.7.1. Analytical Solution to Scenario 1 -- 2.7.2. Results of Calculations for Scenario 1 -- 2.8. RUPTURE OF THE PRIMARY TIC SHELL -- 2.9. GROWTH OF A TIC LAYER ON THE SURFACE OF A SOLID CARBON PARTICLE -- 2.9.1. Analytical Solution to Scenario 2 -- 2.9.2. Results of Calculations for Scenario 2 -- 2.9.3. Displacement of the C/TiC Interface in the "Emptying-Core" Mechanism -- 2.9.4. Product Porosity in the "Emptying-Core" Mechanism -- 2.10. ANALYSIS OF THE "SHRINKING-CORE" MECHANISM IN THE TI-C SYSTEM -- 2.11. PHASE-

FORMATION-MECHANISM MAP FOR NON-ISOTHERMAL INTERACTION IN THE TI-C SYSTEM -- Chapter 3 MODELING INTERACTION KINETICS IN THE CS OF NICKEL MONOALUMINIDE -- 3.1. INTRODUCTION -- 3.2. PHYSICAL BACKGROUND OF THE MODEL -- 3.2.1. Thermal Aspect -- 3.2.2. Phase Composition of the Reaction Zone -- 3.3. MODEL FORMULATION FOR NIAL FORMATION IN NON-ISOTHERMAL CONDITIONS -- 3.3.1. Structure of the Model -- 3.3.2. Quasi-Isothermal Submodel -- 3.3.3. Non-Isothermal Submodel -- 3.3.4. Sequence of Calculations. 3.4. PARAMETER VALUES FOR MODELING INTERACTION IN THE NI-AL SYSTEM -- 3.4.1. Densities of Phases -- 3.4.2. Interdiffusion Parameters -- 3.5. NUMERICAL MODELING OF NIAL FORMATION IN NON-ISOTHERMAL CONDITIONS -- 3.5.1. Evolution of the Phase Layers -- 3.5.2. Estimation of Critical Heating Rates -- 3.6. PHASE-FORMATION-MECHANISM MAP FOR NON-ISOTHERMAL INTERACTION IN THE NI-AL SYSTEM -- 3.7. CONCLUSION: ROLE OF PHASE-FORMATION-MECHANISM MAPS IN THE CS OF ADVANCED MATERIALS -- Chapter 4 ANALYSIS OF THE EFFECT OF MECHANICAL ACTIVATION ON COMBUSTION SYNTHESIS -- 4.1. INTRODUCTION -- 4.2. STORED ENERGY IN METALS AFTER MECHANICAL ACTIVATION -- 4.2.1. Mechanical Activation vs. Mechanical Alloying -- 4.2.2. Numerical Estimation of Stored Energy in Metals -- 4.3. ANALYSIS OF EXISTING KINETIC THEORIES OF MA-SHS -- 4.4. RELAXATION OF NON-EQUILIBRIUM VACANCIES IN NON-ISOTHERMAL CONDITIONS -- 4.5. A POSSIBLE PHYSICAL MECHANISM OF THE EFFECT OF MECHANICAL ACTIVATION ON CS -- REFERENCES -- INDEX -- Blank Page.

Sommario/riassunto

This text describes basic approaches to modelling non-isothermal interaction kinetics during CS of advanced materials and reveal the existing controversies and apparent contradictions between different theories, and between theory and experimental data.
