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Nota di contenuto	Ultra-High Temperature Ceramics: Materials for ExtremeEnvironment Applications; Copyright; Contents; Acknowledgments; Contributors List; Chapter 1 Introduction; 1.1 Background; 1.2 Ultra-High Temperature Ceramics; 1.3 Description of Contents; References; Chapter 2 A Historical Perspective on Research Related to Ultra-High Temperature Ceramics; 2.1 Ultra-High Temperature Ceramics; 2.2 Historic Research; 2.3 Initial NASA Studies; 2.4 Research Funded by the Air Force Materials Laboratory; 2.4.1 Thermodynamic Analysis and Oxidation Behavior; 2.4.2 Processing, Properties, Oxidation, and Testing 2.4.3 Phase Equilibria2.5 Summary; Acknowledgments; References; Chapter 3 Reactive Processes for Diboride-Based Ultra-High Temperature Ceramics; 3.1 Introduction; 3.2 Reactive Processes for the Synthesis of Diboride Powders; 3.2.1 Elemental Reactions; 3.2.2

Reduction Processes; 3.2.3 Synthesis of Composite Powders; 3.3 Reactive Processes for Oxygen Removing during Sintering; 3.3.1 Oxygen Removal by Reduction Using Boron/ Carbon-Containing Compounds; 3.3.2 Oxygen Removing by Transition Metal Carbides; 3.4 Reactive Sintering Processes
3.4.1 Reactive Sintering from Transition Metals and Boron-Containing Compounds
3.4.2 Reactive Sintering from Transition Metals and Boron;
3.5 Summary; References; Chapter 4 First-Principles Investigation on the Chemical Bonding and Intrinsic Elastic Properties of Transition Metal Diborides TMB_2 ($TM=Zr, Hf, Nb, Ta, \text{ and } Y$); 4.1 Introduction; 4.2 Calculation Methods; 4.3 Results and Discussion; 4.3.1 Lattice Constants and Bond Lengths; 4.3.2 Electronic Structure and Bonding Properties; 4.3.3 Elastic Properties; 4.4 Conclusion Remarks; Acknowledgment; References
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6.5 MB_2 with Carbon or Carbides
6.6 MB_2 with SiC ; 6.7 MB_2-SiC Composites with Third Phases; 6.8 Effects of Sintering Aids on High-Temperature Stability; 6.9 Transition Metal Carbides; 6.10 Conclusions; Acknowledgments; References; Chapter 7 UHTC Composites for Hypersonic Applications; 7.1 Introduction; 7.2 Preparation of Continuous-Fiber-Reinforced UHTC Composites; 7.2.1 Precursor Infiltration and Pyrolysis; 7.2.2 Chemical Vapor Deposition; 7.2.3 Reactive Melt Infiltration; 7.2.4 Slurry Infiltration and Pyrolysis; 7.2.5 Combined Processes; 7.2.6 Functionally Graded UHTC Composites
7.3 UHTC Coatings

Sommario/riassunto

"This book will capture historic aspects and recent progress on the research and development of ultra-high temperature ceramics. This will be the first comprehensive book focused on this class of materials in more than 20 years. The book will review historic studies and recent progress in the field. The intent is to provide a broad overview and critical analysis rather than focus on the latest scientific results. The content will include synthesis, powder processing, densification, property measurement, and characterization of boride and carbide ceramics. Emphasis will be on materials for hypersonic aerospace applications such as wing leading edges and propulsion components for vehicles traveling faster than Mach 5, but will also include materials used in the extreme environments associated with high speed cutting tools and nuclear power generation"--

"This book provides a snapshot of the current state-of-the-art in the processing, densification, properties, and performance of boride and carbide ceramics. The book contains contributions from leading experts who have active research in ultra-high temperature ceramics"

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