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| | Autore | Biermann Horst |
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| | Disciplina | 620.11 |
| | Soggetti | Building materials<br>Metals<br>Ceramics<br>Glass<br>Composite materials<br>Engineering—Materials<br>Mathematical models<br>Structural Materials<br>Metallic Materials<br>Ceramics, Glass, Composites, Natural Materials<br>Materials Engineering<br>Mathematical Modeling and Industrial Mathematics |
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| | Nota di contenuto | From the contents: Powder Metallurgy -- Steel Infiltration -- Steel Technology -- Electron Beam Welding -- Materials Testing -- Fracture Mechanics -- Microanalysis -- Thermodynamic Modelling -- Fluid Dynamics -- Continuum Mechanics -- Micromechanical Materials Modelling. |
| | Sommario/riassunto | This open access book presents a collection of the most up-to-date research results in the field of steel development with a focus on pioneering alloy concepts that result in previously unattainable |

materials properties. Specifically, it gives a detailed overview of the marriage of high-performance steels of the highest strength and formability with damage-tolerant zirconia ceramics by innovative manufacturing technologies, thereby yielding a new class of high-performance composite materials. This book describes how new high-alloy stainless TRIP/TWIP steels (TRIP: TRansformation-Induced Plasticity, TWIP: TWinning-induced Plasticity) are combined with zirconium dioxide ceramics in powder metallurgical routes and via melt infiltration to form novel TRIP-matrix composites. This work also provides a timely perspective on new compact and damage-tolerant composite materials, filigree light-weight structures as well as gradient materials, and a close understanding of the mechanisms of the phase transformations. With a detailed application analysis of state-of-the-art methods in spatial and temporal high-resolution structural analysis, in combination with advanced simulation and modelling, this edited volume is ideal for researchers and engineers working in modern steel development, as well as for graduate students of metallurgy and materials science and engineering.