



nanomaterials



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Novel Structural and Functional Material Properties Enabled by Nanocomposite Design

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Nanocomposites have the potential for novel material properties that significantly exceed the capabilities of their individual constituent phases, thereby enabling the exploration of gaps in material property charts. In this book, we aim to provide an overview of the current state of the art, enabling the investigation of novel structural and functional material properties through better understanding and implementation of nanocomposite design. The covered properties of interest encompass the whole material usage span, starting from the structural modifications of nanocomposites by employing different synthesis routes, to assessing their microstructure-dependent mechanical properties such as strength, ductility, and high-temperature stability. Furthermore, we address the functional characteristics of nanocomposites, such as soft magnetic properties or thermoelectricity, as well as tailored property adjustment through design strategies (bioinspired design, chemical sensitivity, bio sensing). Thus, the included contributions detail methods for the synthesis, characterization, modeling, and in-depth understanding of the mechanisms governing the outstanding properties of this fascinating material class.



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