

Special Issue Reprint

Advanced Composites

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Engineering practice has revealed that innovative technologies' structural applications require new design concepts related to developing materials with mechanical properties tailored for construction purposes. This would allow the efficient use of engineering materials. The efficiency can be understood in a simplified and heuristic manner as the optimization of performance and the proper combination of structural components, leading to the consumption of the least amount of natural resources. The solution to the eco-optimization problem, based on the adequate characterization of the materials, will enable implementing environmentally friendly engineering principles when the efficient use of advanced materials guarantees the required structural safety. Identifying fundamental relationships between the structure of advanced composites and their physical properties is the focus of this book. The collected articles explore the development of sustainable composites with valorized manufacturability corresponding to Industrial Revolution 4.0 ideology. The publications, amongst others, reveal that the application of nano-particles improves the mechanical performance of composite materials; heat-resistant aluminium composites ensure the safety of overhead power transmission lines; chemical additives can detect the impact of temperature on concrete structures. This book demonstrates that construction materials' choice has considerable room for improvement from a scientific viewpoint, following heuristic approaches.

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