

Special Issue

Material Innovation and Technology Enhancement: Synergistic Pathways for Building Decarbonization

Message from the Guest Editors

This Special Issue will delve into core pathways for deep decarbonization across the entire building life cycle. Research focusing on the critical role of low-carbon building materials (such as alkali-activated cementitious materials, recycled aggregates, and phase-change materials) in reducing embodied carbon during the construction phase—alongside the fundamental value of advanced energy-saving technologies (including high-performance building envelopes, building integrated photovoltaics, and renewable energy integration) in cutting operational carbon during the use phase—is welcome. Significantly, this Special Issue encourages exploration of systemic synergies and integrated strategies between material-based source emission reduction and technology-driven long-term energy efficiency. We welcome original research and reviews focusing on material innovation, technology optimization, performance assessment, multi-scale modeling, policy-economic analysis, and practical engineering applications.

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About the Journal

Message from the Editor-in-Chief

Current urban environments are home to multi-modal transit systems, extensive energy grids, a building stock, and integrated services. Sprawling neighborhoods are composed of buildings that accommodate living and working quarters. However, it is expected that the cities and communities of the future will face complex and enormous challenges, including maintenance, interconnectivity, resilience, energy efficiency, and sustainability issues, to name but a few. A smart city uses advanced technologies and a digital infrastructure to improve the outcomes in every aspect of a city's operations. A smart building optimizes the experience of occupants, staff, and management by using a modern and connected environment. Innovations in technology that can bring dramatic improvements to design, planning, and policy are critical in developing the cities and buildings of the future.

Editor-in-Chief

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