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Advances in Cementitious Composites for Sustainable Buildings

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Deadline for manuscript submissions:
closed (15 April 2021)

Message from the Guest Editors

Developments in composites have revolutionized our building materials since the dawn of construction. In recent years, significant developments have occurred in cementitious composites that have been realized via the incorporation of nano-sized particles, integration of living tissue (mycelium, bacteria, etc.), addition of electronics, and advances in graphene. These developments have led to cementitious composites with engineered properties including biomimicry (self-cleaning, self-healing), improved flexibility and strength, energy-harvesting, self-sensing, and diagnosis potential. Breakthroughs in the use of lower primary material usage (reduced cement content), recycled materials, fatigue-resistant materials (under cycles of freezing and thawing or wetting and drying), and quicker setting and hardening cementitious composites have extended the limits of the industrial applications and opened new horizons in research.

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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.

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