crystals

MDPI

Editorial

Editorial for Special Issue Cement and Construction Materials

Payam Hosseini [1,*] and Baoguo Han [2,*]

[1] Department of Civil and Environmental Engineering, University of Wisconsin-Madison, Madison, WI 53706, USA
[2] School of Civil Engineering, Dalian University of Technology, 416-1 No. 3 Linggong Road, Ganjingzi District, Dalian 116024, China
* Correspondence: hosseinighas@wisc.edu (P.H.); hanbaoguo@dlut.edu.cn (B.H.)

Cement-based materials have always been the main choice for the construction of civil engineering infrastructures. This necessitates advancing our understanding of materials behavior and developing new techniques to promote high-performance (mechanically stronger and more durable), smart/multifunctional, and sustainable (low environmental footprint and energy consumption) construction materials.

Introducing alternative binders such as alkali-activated materials, modifying microstructures of cement-based materials by using various types of fillers (e.g., mineral admixture, fibers, solid waste or by-product), developing recycling strategies and CO_2 mineralization as well as smart/multifunctional materials are all among the most recent developments in the manufacturing of advanced construction materials. In addition, advancements in material characterization and simulation techniques can help us to better understand the performance of cement-based and construction materials, leading to the promotion of their practical applications.

Considering all the technological and scientific advances in cement-based and construction materials, the Special Issue "Advances in Cement-Based and Construction Materials" includes the following new findings of a broad range of cement-based and construction materials:

Kong et al. [1] investigated the strength development and microstructure evolution of alkali-activated fly ash, granulated blast furnace slag, and metakaolin mortars under standard curing and steam curing as well as oven curing conditions.

Nimafar et al. [2] performed an experimental study on the application of calcium carbonate precipitation bacteria as a new approach to repairing damaged concrete when exposed to high temperatures.

Jiang et al. [3] studied the static and dynamic characteristics of stabilized iron tailings and fiber-modified lime and fly ash-stabilized iron tailings under dry and wet cycles through an unconfined compressive strength test and splitting test as well as dynamic triaxial test, thus exploring the influence of fiber on lime and fly ash-stabilized iron tailings under dry and wet cycles at an early curing age.

Cheng et al. [4] predicted the gas permeabilities of mortar by using the Hagen–Poiseuille equation combined with a processed backscattered electron image, the Katz–Thompson equation, and the Winland model with pore parameters obtained from mercury intrusion porosimetry tests.

Amin et al. [5] investigated the effectiveness of an agricultural by-product wheat straw ash (WSA) as an internal curing agent in reducing the autogenous shrinkage of high-performance concrete.

Jeong et al. [6] developed eco-friendly and electrically conductive cementitious composites using biochar from waste coffee beans, which were directly pyrolyzed into eco-friendly and electrically conductive biochar.

Huang et al. [7] carried out a detailed study regarding the influences of magnesium sulfate replacing magnesium chloride on the setting time and compressive strength as well

check for updates

Citation: Hosseini, P.; Han, B. Editorial for Special Issue Cement and Construction Materials. *Crystals* **2022**, *12*, 1490. https://doi.org/10.3390/cryst12101490

Received: 17 October 2022
Accepted: 18 October 2022
Published: 20 October 2022

as water resistance of magnesium oxychloride cement, and they conducted the analysis of phase composition and micro morphology of hydration products by using XRD and SEM.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Kong, L.; Fan, Z.; Ma, W.; Lu, J.; Liu, Y. Effect of Curing Conditions on the Strength Development of Alkali-Activated Mortar. *Crystals* **2021**, *11*, 1455. [CrossRef]
2. Nimafar, M.; Samali, B.; Hosseini, S.J.; Akhlaghi, A. Use of Bacteria Externally for Repairing Cracks and Improving Properties of Concrete Exposed to High Temperatures. *Crystals* **2021**, *11*, 1503. [CrossRef]
3. Jiang, P.; Zhou, X.; Qian, J.; Li, N. Experimental Study on the Influence of Dry–Wet Cycles on the Static and Dynamic Characteristics of Fiber-Modified Lime and Fly Ash-Stabilized Iron Tailings at Early Curing Age. *Crystals* **2022**, *12*, 568. [CrossRef]
4. Cheng, Z.; Wang, Y.; Zhao, J.; Huang, C. Gas Permeability Prediction of Mortar Samples Based on Different Methods. *Crystals* **2022**, *12*, 581. [CrossRef]
5. Amin, M.N.; Siffat, M.A.; Shahzada, K.; Khan, K. Influence of Fineness of Wheat Straw Ash on Autogenous Shrinkage and Mechanical Properties of Green Concrete. *Crystals* **2022**, *12*, 588. [CrossRef]
6. Jeong, J.; Jeon, G.; Ryu, S.; Lee, J.H. Ecofriendly and Electrically Conductive Cementitious Composites Using Melamine-Functionalized Biochar from Waste Coffee Beans. *Crystals* **2022**, *12*, 820. [CrossRef]
7. Huang, Q.; Zheng, W.; Li, Y.; Chang, C.; Wen, J.; Dong, J.; Xiao, X. The Effect of Doping High Volume Magnesium Sulfate on Properties of Magnesium Oxychloride Cement. *Crystals* **2022**, *12*, 857. [CrossRef]