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| **사람, 의류, 넥타이, 인간의 얼굴이(가) 표시된 사진  자동 생성된 설명** | **Haemin Song**  Postdoctoral Researcher  Korea Institute of Ceramic Engineering and Technology (KICET)  **Office:** 436, 101 Soho-ro, Jinju-si, Gyeongnam, South Korea  **E-mail:** vstvst930327@gmail.com  **Phone:** +82-10-2661-9396  **Website:** https://vstvst930327.wixsite.com/haeminsong |

**Research Interests**

* + Smart and Environmental Construction Materials
  + Low-CO2 Concretes
  + Zero-cement Binders using Industrial By-products
  + Microstructural Analysis
  + Thermal, Acoustic, and 3D Imaging Analysis

**Education**

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| Mar 2016  ̶ Aug 2022 | **Ph.D. in Urban and Environmental Engineering**   * Ulsan National Institute of Science and Technology (UNIST), South Korea * Advisor: Prof. Jae Eun Oh * Dissertation: Integrated Thermal Analysis for Development and Numerical Model of Concrete containing Phase Change Materials |
| Mar 2012  ̶ Feb 2016 | **B.S. in Urban and Environmental Engineering & Chemical Engineering**   * Ulsan National Institute of Science and Technology (UNIST), South Korea |

**Research Experience**

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| Dec 2024  ̶ Present | **Postdoctoral Researcher**   * Carbon Neutral Materials Center * Korea Institute of Ceramic Engineering and Technology (KICET), Korea * Advisors: Dr. Woo Sung Yum |
| Mar 2024  ̶ Nov 2024 | **Postdoctoral Researcher -** Research Associate   * School of Civil and Environmental Engineering * University of New South Wales (UNSW), Australia * Advisors: Dr. Taehwan Kim and Assoc. Prof. Ailar Hajimohammadi |
| Sep 2022  ̶ Feb 2024 | **Postdoctoral Researcher -** Visiting Research Fellow   * School of Civil and Environmental Engineering * University of New South Wales (UNSW), Australia * Advisor: Dr. Taehwan Kim |
| Sep 2022  ̶ Mar 2024 | **Postdoctoral Researcher -** Research Associate   * School of Urban and Environmental Engineering * Ulsan National Institute of Science and Technology (UNIST), South Korea * Advisor: Prof. Jae Eun Oh |

**Research Project**

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| Sep 2024  – Aug 2027 | **Co-Investigator:** Post-Doc. Growth-type Joint Research   * National Research Foundation of Korea * Grants: Total 900,000,000 KRW (=~625,000 USD) * Title: Advanced CO2 Mineralization in Construction Material through Electrolysis with Atomically Dispersed Catalysts |
| Oct 2023  – Sep 2024 | **Principal Investigator (PI):** International Mobility Program   * National Research Foundation of Korea * Grants: Total 20,000,000 KRW (=~14,300 USD) * Title: Development of Integrated Porosity Evaluation Method for Eco-friendly Hempcrete using Hybrid Pore Fractionation and 3D Porosity Analysis Techniques |
| Mar 2017  ̶ Feb 2022 | **Principal Investigator (PI):** Global Ph.D. Fellowship (GPF)   * National Research Foundation of Korea * Grants: Total 100,000,000 KRW (=~70,000 USD) * Title: Development of New PCM-aggregate and Heat Transfer Model in Concrete Composites toward Highly Energy-efficient Structures |

**Scholarship**

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| Mar 2016  ̶ Feb 2022 | **UNIST Academic Performance Scholarship**   * Ulsan National Institute of Science and Technology (UNIST), South Korea * Grants: Total 46,000,000 KRW (=~32,200 USD) |
| Mar 2012  ̶ Feb 2016 | **UNIST Academic Performance Scholarship**   * Ulsan National Institute of Science and Technology (UNIST), South Korea * Grants: Total 22,000,000 KRW (=~ 15,500 USD) |

**Teaching Experience**

**Graduate Teaching Assistant at UNIST**

* + Concrete Structures (2016 Spring)
  + Properties of Concrete (2016 Fall, 2018 Fall)

**Journal Publications**

* + Journal Lists (from JCR 2023)

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| **Journals** | **Publisher** | **Impact Factor (IF)** | **Rank by Journal IF** |
| Cement and Concrete Research | Elsevier | 10.9 | TOP 0.5% |
| Cement and Concrete Composites | Elsevier | 10.8 | TOP 1.6% |
| Journal of Cleaner Production | Elsevier | 9.7 | TOP 6.6% |
| Construction and Building Materials | Elsevier | 7.4 | TOP 3.0% |
| Journal of Building Engineering | Elsevier | 6.7 | TOP 4.7% |
| International Journal of Concrete Structures and Materials | Springer | 3.6 | TOP 22.4% |
| Materials and Structures | Springer | 3.4 | TOP 24.7% |
| Materials | MDPI | 3.1 | TOP 21.7% |
| Applied Sciences | MDPI | 2.5 | TOP 24.3% |

* **Peer-Reviewed Journal Publications**

\* Corresponding Author

1. (*In-preparation*) **Haemin Song**, Taehwan Kim\*, Ailar Hajimohammadi, “One-part geopolymerization on bag house dust using Ca(OH)2 and Na2CO3”
2. (*In-preparation*) **Haemin Song**, Jae Eun Oh, Taehwan Kim\*, “Integrated pore analysis on bottom ash using synchrotron X-ray computed tomography”
3. (In-Submitted) **Haemin Song**, Minseok Oh, Intae Kim, Bae-Geun Son, Hyang-Sun Lee, Woo Sung Yum, Hun Song\*, "Homogenization of Metastable Chlorine By-pass Dust through Mineral Carbonization", **International Journal of Concrete Structures and Materials**
4. (*In-Submitted*) In Kuk Kang, Jae Hong Kim\*, Tae Yong Shin, **Haemin Song**, and Taehwan Kim, “Poly(2-(dimethylamino)ethyl methacrylate)-graft-poly(ethylene oxide) copolymer for stabilizing cementitious materials”
5. (*Under review*) **Haemin Song**, Siddharth Girish Nair, Taehwan Kim\*, Quang Dieu Nguyen, Yixiang Gan, Haiyi Zhong, Peter J. Irga, Cecilia Gravina da Rocha, Fraser R. Torpy, Sara Wilkinson, Ailar Hajimohammadi, Arnaud Castel, "Thermal and Mechanical Properties of Hempcrete with Low-Carbon Binders: Effects of 3D Distribution and Orientation of Hemp Shivs and Microstructures of Hempcrete,” **Journal of Building Engineering**
6. (*Under review*) **Haemin Song**, Juan Yu, Taehwan Kim, Seyoon Yoon\*, and Jae Eun Oh\*, "Development of PCM-in-water emulsion as mixing water replacement for phase change material (PCM) incorporation in Portland cement paste," **Construction and Building Materials**
7. (*Accepted*) Zuobang Yao, Ram Pal, **Haemin Song**, Arthur Van de Keere, Ali Kashani, Elke Gruyaert, Taehwan Kim\*"Chloride transport, binding, and microstructure in alkali-activated concrete with different types of precursor combinations," **Cement and Concrete Research**
8. **Haemin Song**, Arnaud Castel, Ailar Hajimohammadi, Jae Eun Oh, and Taehwan Kim\*, “Detailed characterisation of hemp and hempcrete pore structures: Effects on thermal and acoustic properties” **(2024) Cement and Concrete Research**, Volume 186, Pages 107702
9. Dohoon Kim, **Haemin Song**, Juan Yu, Sungwon Sim, Dongho Jeon, and Jae Eun Oh\*, “Development of lightweight and low-crystalline artificial aggregate using cementless fly ash binder for neutron shielding concrete manufacture,” **(2024) Cement and Concrete Composites**, Volume 152, Pages 105674
10. Zuobang Yao, Alireza Kashani, Aditya Rawal, **Haemin Song\***, and Taehwan Kim, “Heat-induced phase transitions in mining tailings to create alternative supplementary cementitious materials,” **(2024) Resources and Conservation and Recycling**, Volume 210, Pages 107818
11. **Haemin Song**, Seyoon Yoon, Jae-Eun Oh\*, and JI Suh\*, “Thermal performance evaluation of silica dip-coated phase change material beads for thermal energy storage in cement-based composites,” **(2024) Construction and Building Materials**, Volume 425, Pages 135907
12. **Haemin Song**, Dohoon Kim, Seyoon Yoon, Woo Sung Yum, Dongho Jeon, and Jae Eun Oh\*, “Development of artificial leak-free phase change material (PCM) aggregates using emulsion technique cementless binder, and cold-bonded pelletization,” **(2024) Construction and Building Materials**, Volume 411, Pages 134293
13. Seyoon Yoon, Min Kyoung Kim, Tae Uk Kim, Dongho Jeon, **Haemin Song**, Jung-Il Suh, Jae Eun Oh, Dong Joo Kim\*, “Enhancing image resolution in single-side electrical resistance tomography (ERT) by utilizing theoretical sensitivity analysis: Experimental validation and application to cement mortar,” **(2024) Journal of Building Engineering**, Pages 108480
14. Abdelrahman Hamdan, **Haemin Song**, Zuobang Yao, Mohammed Fouad Alnahhal, Taehwan Kim\*, Ailar Hajimohammadi, “Modifications to reaction mechanisms, phase assemblages and mechanical properties of alkali-activated slags induced by gypsum addition,” **(2023) Cement and Concrete Research**, Volume 174, Pages 107311
15. Juan Yu, Sungwon Sim, **Haemin Song**, Dohoon Kim, Kyungcheol Jang, Dongho Jeon, Seung Cho, Jae Eun Oh\*, “Examination of sulfate resistance of nano-alumina added ordinary Portland cement paste, focusing on the two different crystallinity of nano-aluminas,” **(2023) International Journal of Concrete Structures and Materials**, Volume 17 (1), Pages 1-11
16. **Haemin Song**, Sungwon Sim, Dongho Jeon, Dohoon Kim, Juan Yu, Kyungcheol  Jang, Jae Eun Oh\*, “Development of near-white surface of Ca(OH)2-Na2CO3-activated coal bottom ash,” **(2023) Construction and Building Materials**, Volume 376, Pages 131055
17. **Haemin Song**, Juan Yu, Jae Eun Oh\*, Jung-Il Suh\*, “Production of lightweight cementless binders using supplementary cementitious materials to replace autoclaved aerated concrete blocks,” **(2022) Journal of Cleaner Production**, Pages 135,397
18. **Haemin Song**, Woo Sung Yum, Sungwon Sim, Dongho Jeon, Seyoon Yoon\*, Jae Eun Oh\*, “Proposed specific heat capacity model for a concrete wall containing phase change material (PCM) under field experiment conditions,” **(2022) Construction and Building Materials**, Volume 336, Pages 127,381
19. Woo Sung Yum, Juan Yu, Dongho Jeon, **Haemin Song**, Sungwon Sim, Dohoon Kim, Jae Eun Oh\*, “Mechanical and Durability Properties of Cementless Concretes Made Using Three Types of CaO-Activated GGBFS Binders,” **(2021) Materials**, Volume 15 (1), Pages 271
20. Juan Yu, **Haemin Song**, Dongho Jeon, Sungwon Sim, Dohoon Kim, Hwan Lee, Seyoon Yoon, Woo Sung Yum\*, Jae Eun Oh\*, “Influence of the Degree of Crystallinity of Added Nano-Alumina on Strength and Reaction Products of the CaO-Activated GGBFS System,” **(2021) Construction and Building Materials**, Volume 296, Pages 123,647
21. Sungwon Sim, Dongho Jeon, Woo Sung Yum, **Haemin Song**, Dohoon Kim, Jae Eun Oh\*, “Development of a Clinker-Free White Binder of One-Part CaO-Activated GGBFS with TiO2 Addition,” **(2020) Construction and Building Materials**, Volume 248, Pages 118,705
22. Dongho Jeon, Woo Sung Yum, **Haemin Song**, Seyoon Yoon, Younghoon Bae\*, Jae Eun Oh\*, “Use of Coal Bottom Ash and CaO-CaCl2-Activated GGBFS Binder in the Manufacturing of Artificial Fine Aggregates through Cold-Bonded Palletization,” **(2020) Materials**, Volume 13(24), Pages 5,598
23. Jung-Il Suh, Woo Sung Yum, **Haemin Song**, Hong-Gun Park\*, Jae Eun Oh\*, “Influence of Calcium Nitrate and Sodium Nitrate on Strength Development and Properties in Quicklime (CaO)-Activated Class F Fly Ash System,” **(2019) Materials and Structures**, Volume 52(6), Pages 1-13
24. Hwan Lee, Dongho Jeon, **Haemin Song**, Sungwon Sim, Dohoon Kim, Juan Yu, Kyung Hwa Cho, Jae Eun Oh\*, “Recycling of Reverse Osmosis (RO) Reject Water as a Mixing Water of Calcium Sulfoaluminate (CSA) Cement for Brick Production,” **(2019) Applied Sciences**, Volume 9(23), Pages 5,044
25. Sungwon Sim, Hwan Lee, Dongho Jeon, **Haemin Song**, Woo Sung Yum, Dohoon Kim, Jung-Il Suh, Jae Eun Oh\*, “Gypsum-Dependent Effect of NaCl on Strength Enhancement of CaO-Activated Slag Binders,” **(2018) Applied Sciences**, Volume 8(12), Pages 2,515
26. Dongho Jeon, Woo Sung Yum, **Haemin Song**, Sungwon Sim, Jae Eun Oh\*, “The Temperature-Dependent Action of Sugar in the Retardation and Strength Improvement of Ca(OH)2-Na2CO3-Activated Fly Ash Systems through Calcium Complexation,” **(2018) Construction and Building Materials**, Volume 190, Pages 918-928
27. Woo Sung Yum, Yeonung Jeong, **Haemin Song**, Jae Eun Oh\*, “Recycling of Limestone Fines using Ca(OH)2-and Ba(OH)2-Activated Slag Systems for Eco-Friendly Concrete Brick Production,” **(2018) Construction and Building Materials**, Volume 185, Pages 275-284
28. **Haemin Song**, Yeonung Jeong, Sungchul Bae, Yubin Jun, Seyoon Yoon\*, Jae Eun Oh\*, “A Study of Thermal Decomposition of Phases in Cementitious Systems using HT-XRD and TG,” **(2018) Construction and Building Materials**, Volume 169, Pages 648-661

**Patent**

* **Granted Patent**
* **Haemin Song**, and Jae Eun Oh, “Colored-binder composition using bottom ash and hardened product manufacturing method therof,” **(2024) Grant number: 1026831440000**

**Analytical Techniques**

* **Synchrotron Techniques at Pohang Acceleration Laboratory (PAL) in South Korea** 
  + Synchrotron X-ray Diffraction (XRD)
  + Synchrotron Radiation Micro-Computed Tomography
* **Thermal Analysis Techniques**
  + High-Temperature XRD
  + Thermogravimetric Analysis (TGA)
  + Differential Scanning Calorimeter (DSC)
  + Thermal Conductivity
  + Infrared (IR) Camera
* **Sample Preparation Techniques**
  + Alkaline Activated Ground Granulated Blast Furnace Slag (GGBFS)
  + Synthesis of Cement Clinker and GGBFS-like glass
  + Portland Cement, Paste, Mortar, and Concrete
  + Cold-bonded Pelletization for Making Artificial Aggregate
  + Cementitious Materials containing Phase Change Material (PCM)
* **Other Techniques** 
  + Scanning Electron Microscope (SEM)
  + Nuclear Magnetic Resonance (NMR)
  + Laser Diffraction Particle Size Analyzer
  + X-ray Fluorescence (XRF)
  + Ultraviolet-Visible (UV) Spectroscopy
  + Mercury Intrusion Porosimetry (MIP)
  + Zeta-Potential Measurement
  + Fourier-Transform Infrared (FT-IR) Spectroscopy
  + Compressive Strength Test
  + Numerical Analysis using MATLAB