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應用物理及材料工程研究院
INSTITUTO DE FÍSICA APLICADA E ENGENHARIA DE MATERIAIS
INSTITUTE OF APPLIED PHYSICS AND MATERIALS ENGINEERING

IAPME Seminar

Carbon-Negative Building Materials Production by CO_2 Mineralization of Alkaline Industrial Residues: Design, Reaction Mechanism, and Industrial Applications

03 December 2025

Prof. Zhengwu JIANG
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Venue: N23-1004b
Time: 11:00 - 12:00
Hosted by: Prof. Guoxing SUN

Abstract

Decarbonization of the cement and concrete industry is critical to China's carbon peaking and neutrality goals. As an important approach to mitigating the greenhouse gas emissions associated with cement and concrete production, CO_2 mineralization has aroused the interest of academia and the industry worldwide. This report overviews recent advances in CO_2 mineralization techniques for use in building materials production, and presents our research progress on carbon-negative building materials production that uses advanced CO_2 mineralization techniques and 100% industrial residues as raw materials. The mineralization reaction mechanism of alkaline industrial residues as a function of their chemical/mineralogical compositions will be highlighted. Application of the CO_2 mineralization technique at the industrial scale will also be demonstrated.

Biography

Prof. Zhengwu JIANG is a Professor and Doctoral Supervisor at Tongji University, and serves as Director of the Key Laboratory of Advanced Civil Engineering Materials, Ministry of Education. He has been awarded more than 10 prestigious honors, including the Second Prize of the National Technological Invention Award. Additionally, he has received accolades such as the Outstanding Young Scientist Award, Chinese Silicate Society and the title of Contemporary Outstanding Engineer. Prof. JIANG has been engaged in the following areas: Sustainable cement-based materials, High-performance and special concretes, Self-healing concrete materials and methods - Design theory and technology for concrete under extreme conditions, Comprehensive utilization of solid waste and environmental assessment. He was the principal investigator on over 50 projects, including the National 973 Programme, the National Key Technology R&D Programme (12th Five-Year Plan), the National Key Projects (13th Five-Year Plan) and NSFC grants. The research outcomes have been applied in nearly 50 major engineering projects across China. In the realm of academic contributions, he has published 3 academic monographs and 4 co-authored translated works and edited volumes. He has authored over 400 academic papers in domestic and international journals, with more than 100 indexed by SCI and EI, and his works have garnered over 4,000 citations. He holds more than 60 national invention patents and has filed more than 50 national invention patent applications as the first applicant.

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