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Department of Civil and Environmental Engineering

## **Mineralization of cement and waste residues: Catalyzing a zero-carbon future for construction materials**

by

**Professor Tung-Chai Ling**

**School of Civil Engineering  
Hunan University, China**

**Host: Dr. Du Hongjian**

**Date: 20 June 2023, Tuesday**

**Time: 4 - 5 pm**

**Venue: E1-06-01**

**National University of Singapore  
College of Design and Engineering  
3 Engineering Drive 2  
Singapore 117578**



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**\*\*\*Seats are limited. Please register early. All are welcome and admission is free\*\*\***

### **Abstract**

Accelerated carbonation to mineralize industrial flue gas CO<sub>2</sub> is gaining increasing momentum for combating climate change. Industrial waste residues present in a large amount are an attractive avenue for the affective capture of CO<sub>2</sub>. This technology creates dual environmental benefits: simultaneously utilizing solid wastes and permanently storing CO<sub>2</sub>. More importantly, the industrial waste residues are usually located in the vicinity of the CO<sub>2</sub> source. In this presentation, different types of industrial wastes suitable for mineral carbon sequestration and the corresponding process routes will be introduced. As the main resulting product of the carbonation process, CaCO<sub>3</sub> has been proven to be particularly useful in the production of construction materials. The practical applications of upcycling the generated CaCO<sub>3</sub> in various types of construction products will also be discussed. Considering that the amount of CO<sub>2</sub> that can be consumed by mineralizing steel slag produced in China alone is estimated to be equal to the total amount of current global CCUS capacity (63Mtpa), a wider application of accelerated mineral carbonation in developing sustainable construction products within the next decade is expected to substantially cut the greenhouse gas emissions from cement and concrete industry, which echoes a long-standing call for achieving the Net Zero Carbon Emission in the construction industry.

## Speaker's Biography



Prof. Tung-Chai LING is a professor from Hunan University. His research interest focuses on the resource utilization of solid wastes and carbon sequestration technology in the field of construction materials. He has presided over 18 competitive research projects, including NSFC's Research Fund for International Senior Scientists. He has published over 150 SCI journal papers, garnering over 6,000 citations with a h-index of 46. He is listed as one of the top 2% in 2020-22 global scientists for career-long impact and named as 2022 Most Cited Chinese Researchers by Elsevier for field of civil engineering. He has been elected as a Fellow of the ASEAN Academy of Engineering and Technology (AAET) and serves as the associate editor of the ASCE Journal of Materials in Civil Engineering. He

was awarded the "Robert L'Hermite Medal" by RILEM in 2020 (first scholar from a Chinese university to receive this prestigious medal since the inception of the medal in 1967).

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Map of Seminar Room E1-06-01, 3 Engineering Drive 2, Singapore 117578

