



澳門大學
UNIVERSIDADE DE MACAU
UNIVERSITY OF MACAU



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 Newsletter

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◇ Content

1. Research Highlights

- a. Publications
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2. Upcoming Events

❖ Publications (IF≥8, and/or nature Index; *corresponding author)

1. **Qinglu Yu**, Xing Ming, Yueyang Wang, Long Sun, Mingkai Cui, and **Guoxing Sun***. Effects of highly dispersed LDH nano-platelets on chloride binding and corrosion protection of cementitious materials. *Cement and Concrete Composites*, 163, 106178 (2025). DOI:10.1016/j.cemconcomp.2025.106178. [2024 IF=13.1]

Cement and Concrete Composites 163 (2025) 106178



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Cement and Concrete Composites

journal homepage: www.elsevier.com/locate/cemconcomp



Effects of highly dispersed LDH nano-platelets on chloride binding and corrosion protection of cementitious materials



Qinglu Yu^a, Xing Ming^b, Yueyang Wang^a, Long Sun^c, Mingkai Cui^d, Guoxing Sun^{a,*}

❖ Research Stories

UM research team developed novel strategy of improving chloride binding and corrosion protection for cementitious materials

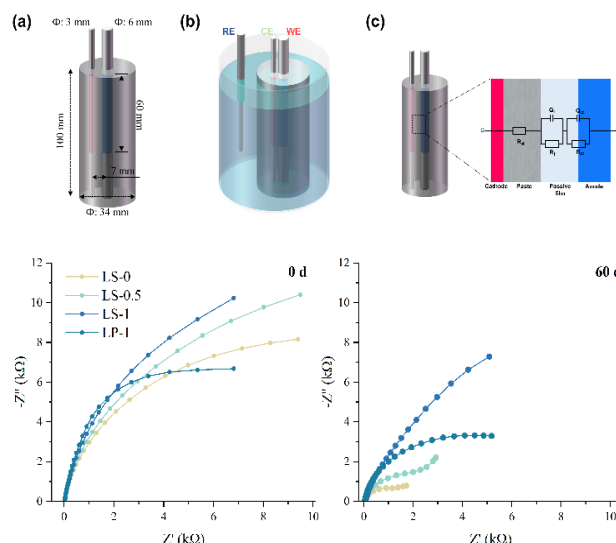
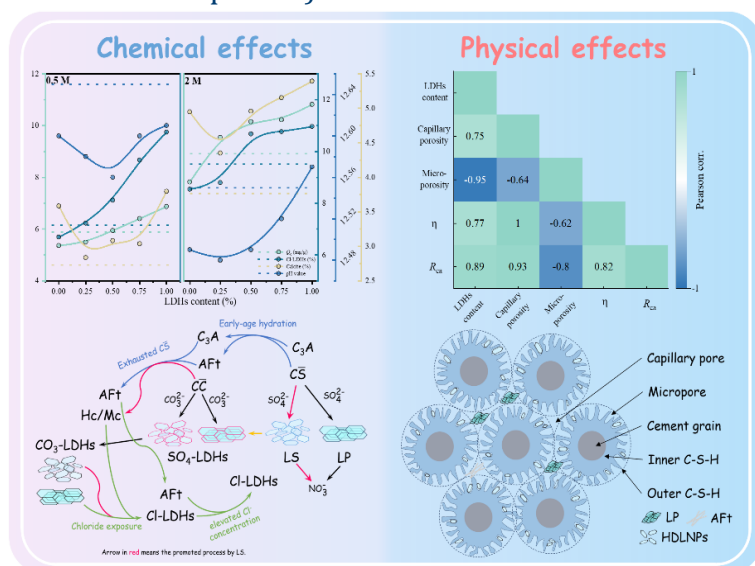
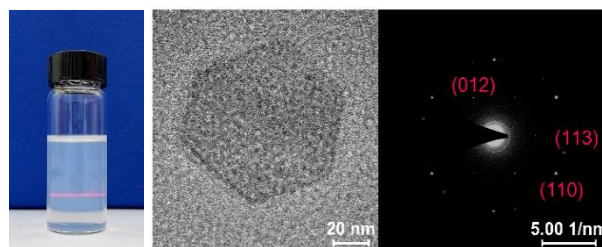
- The chemical binding of free chloride ions in cementitious materials, crucial for prolonging their lifespan, relies heavily on aluminate hydrates and can be modulated by incorporating the layered double hydroxides (LDHs). Yet, the currently synthesized LDHs in field of cement and concrete usually suffer from nano crystallites aggregation.
- In the method involving rapid co-precipitation followed by hydrothermal treatment, the team has successfully synthesized well-separated nano-platelets of LDHs (HDLNPs).
- In addition to triggering enhanced generation of aluminate hydrates with high chlorides affinity, HDLNPs are capable to maintain $\text{Cl}^-/\text{NO}_3^-$ in pore solution below a critical threshold to inhibit rebar corrosion (charge transfer resistance R_{ct} gets ~ 10 times higher than control group after 60-day chlorides exposure).



Mr. Qinglu Yu
(于清露)



Prof. Guoxing Sun
(孫國星)



Qinglu Yu, Xing Ming, Yueyang Wang, Long Sun, Mingkai Cui, and **Guoxing Sun***. Effects of highly dispersed LDH nano-platelets on chloride binding and corrosion protection of cementitious materials. *Cement and Concrete Composites*, 163, 106178 (2025). DOI: 10.1016/j.cemconcomp.2025.106178. [2024 IF=13.1]

Prof. Guoxing Sun is the corresponding author of this study, and the first author is Mr. Qinglu Yu, Ph.D. student in IAPME. This work was supported by The Science and Technology Development Fund, Macao SAR (File no. 0076/2022/AFJ, 0007/2024/EIA1), Wuyi University-Hong Kong-Macao Joint Research and Development Fund (File no. 2022WGALH04) and Zhuhai Transportation Holdings Group Co., Ltd. Science and Technology Project (File no. JT-KT202401).



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❖ Upcoming Events



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IAPME Seminar

Weyl-Related Surface Circular Photogalvanic Effect in Nonsymmorphic-Symmetry ZrGeTe₄ Semiconductor



5 November 2025

Prof. Chongyun JIANG

Nankai University

Venue: N23-4018

Time: 14:00 - 15:00

Hosted by: Prof. Shen LAI

Abstract

Weyl semiconductors, combining the high tunability features of semiconductors with the exotic topological properties of Weyl materials, are of great significance for fundamental physics studies and functional topological devices. Despite the potential theoretical implications, few Weyl semiconductors are experimentally discovered. Chirality is an extraordinary feature of Weyl nodes, which can give rise to helicity-resolved photocurrents, known as the circular photogalvanic effect (CPGE). In this talk, we discuss the surface CPGE in nonsymmorphic-symmetry ZrGeTe₄ semiconductors via a specific excitation and detection geometry, demonstrating that it originates from asymmetric helicity-dependent optical transitions between two Kramers–Weyl nodes in the conduction and valence bands. Wavelength-dependent experiments support the chirality-related Weyl features of the CPGE in ZrGeTe₄ semiconductors. It is experimentally confirmed that the Weyl-related surface CPGE is an intrinsic phenomenon that can be flexibly tuned with an in-plane electric field.

Biography

Prof. Chongyun JIANG is a Professor of Nankai University since 2019. His research interest is spintronics and photonics in low-dimensional semiconductors. Recent research topics include photogalvanic effect, anomalous Hall effect that associated with the chiral contrast properties in van der Waals heterostructures. He has published peer-reviewed articles on Nature Electronics, ACS, Laser & Photonics Reviews, etc.

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