Department of Mechanical Engineering
THE UNIVERSITY OF HONG KONG

SEMINAR

Effects of Cyclic Plasticity on the Mechanical and Corrosion Performance of Aluminum Alloys

Date: 28 November, 2025 (Friday)
Time: 10:00 a.m.
Venue: Room 7-34, Haking Wong Building, HKU

Speaker: Professor Wenwen Sun
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Abstract:
Room-temperature cyclic plasticity enables a new precipitation-strengthening route for aluminum alloys, where back-and-forth dislocation motion continuously injects vacancies and drives the formation of 1–2 nm solute clusters without thermal aging, leading to strength–ductility synergy and highly uniform microstructures. Building upon this mechanism, we further apply it to non-heat-treatable AA5083, achieving ~300 MPa yield strength and improved corrosion and sensitization resistance through Mg-Al clustering that delays grain-boundary β-precipitation during service-temperature exposure. This strategy breaks conventional trade-offs and provides a fast, energy-efficient path to high-performance Al alloys.

Biography:
Prof. Wenwen Sun is a Professor and Associate Dean at the School of Materials Science and Engineering, Southeast University, China. She received dual Bachelor degrees from Central South University and Monash University in 2011, and obtained her Ph.D. in Materials Engineering from Monash University in 2015, under the supervision of Prof. Christopher Hutchinson. From 2015 to 2019, she conducted postdoctoral research at Monash University.

She joined Southeast University in 2019. Her current research focuses on microstructural evolution and strengthening–toughening mechanisms of advanced high-strength steels, alloy design and wear resistance of high-entropy alloys, and room-temperature cyclic strengthening of aluminum alloys. She has led several research projects funded by the National Natural Science Foundation of China and the Jiangsu Provincial Natural Science Foundation. To date, she has published over 60 journal papers and contributed to two book chapters.

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. M.X. Huang (mxhuang@hku.hk).