

SEMINAR

HARNESSING TOLERANT MICROBES TO DRIVE MINERAL WEATHERING AND GEOCHEMICAL STABILIZATION IN MINING WASTES

Speaker

Professor Longbin HUANG

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Abstract

Mining wastes such as tailings, are polymineral residues from extracting metals and minerals, which seemingly have no features to support life. However, a small group of extremely tolerant microbes can thrive in these harsh substrates, when specific types of organics and/or minerals are provided. These microbes can be harnessed to catalyse and accelerate mineral weathering and transformation, leading to stabilization of metal(loid)s and soil formation. This talk aims to illustrate the role of tolerant microbes in initiating mineral weathering and hydrogeochemical dynamics in Cu/Pb-Zn tailings and Fe-ore tailings. Our research findings have demonstrated that these microbes can be harnessed to accelerate pedogenesis in tailings into functional soil without pollution risks.

Biography

Prof. Huang is leading large industry projects on rehabilitation of magnetite Fe-ore tailings, bauxite residues (or red mud), Cu/Pb-Zn tailings, and AMD waste rocks. He has pioneered and established new technological concepts of "Eco-engineering tailings into functional technosols" and "Bio-engineering/engineering mineral gels and hardpan systems from tailings for non-pollution outcomes", both of which have progressed into (pre)feasibility stage in scaled-up trials. He has invented a world-leading technology to treat and eco-engineer bauxite residues into soil for plant growth, which for the first time, describes a standardised methodology and criteria to apply this technology under field conditions.



22 November 2023
Wednesday



4:30 pm - 5:30 pm



Civil Engineering
Conference Room
Room 3574 (Lift 27/28)
HKUST

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