



Recent Advances in Ecological Engineering Technologies for Rehabilitation of Metal Mine Tailings

Associate Professor Longbin Huang

*Environment Centres (CMLR), Sustainable Minerals Institute,
The University of Queensland, Brisbane, Qld 4072 Australia*

l.huang@uq.edu.au

ABSTRACT

Metal mine tailings are mineralogically and geochemically nothing like natural soil and rocks, due to the presence of abundant primary/secondary minerals and fine-textured physical properties, which prohibit the conventional and low-cost revegetation after simple remediation. By harnessing the power of functional microbes, bioweathering processes are purposely accelerated by suitable ecological engineering inputs and practices in the tailings for extensive mineral formation/transformation and hydro-geochemical stabilization. From here, the cascaded and subsequent processes are diverged into (1) soil (i.e. technosol) formation in tailings containing relatively low levels of toxic metal(loid)s and other pollutants (e.g., Fe-ore tailings, porphyry Cu tailings, and bauxite residues) and (2) bio-geopolymerization of (bio)weathered minerals and hardpan formation in sulfidic and metallic tailings (e.g., Pb-Zn tailings) and alkaline bauxite residues. The soil (technosol) formed from the suitable types of tailings can be used to reconstruct wholly or partially root zones of recolonising plant species. The purposely engineered hardpan of desired physical, mechanical and geochemical properties form an integrative capping layer covering the reactive tailings in depth, on which root zones will be separated physically and hydraulically from the reactive tailings in depth (i.e., resembling natural clay-pan duplex soil horizons). The present talk will review up-to-date findings from our own research and in literature, with various tailings cases and introduce a new paradigm towards sustainable rehabilitation of metal mine tailings.

Date: 20 April 2018 (Friday)

Time: 2:00 pm – 3:30 pm

Venue: Room Z406, 4/F, Block Z,
The Hong Kong Polytechnic University,
181 Chatham Road South,
Hung Hom, Kowloon

SPEAKER'S BIOGRAPHY

Associate Professor Longbin Huang is currently a Principal Research Fellow, Group Leader in Ecological Engineering of Mine Wastes (soil-plant systems), within Environment Centres (CMLR), Sustainable Minerals Institute (SMI), The University of Queensland. Associate Professor Huang graduated with a Bachelor's Degree in Agronomy (double major in Soil Science and Plant Physiology), PhD in Plant Environmental Physiology, with more than 25 years of experience in soil-plant relations and tailings rehabilitation. Associate Professor Huang has been leading multidisciplinary research projects involving geo-microbial ecology, mineral bioweathering, georhizosphere biology, technosol-plant relations in mined environments. Metal mine waste rehabilitation is a global challenge faced by global mining and mineral processing industries. These projects aim to develop new technologies for ecological engineering of mine wastes such as ferrous and base metal mine tailings (e.g., magnetite tailings, bauxite residues (or red mud), Cu/Pb-Zn tailings), which are different from conventional soil-remediation based approaches.

*** All Interested Are Welcome ***

For further information, please contact Dr. Dan Tsang at Tel. 2766-6072.

Free Admission. Certificates of attendance will be provided to participants if they attend the whole lecture.