



CLEAN WATER AND SANITATION



Research

New Filter to Ensure Clean Water

Dr Jiang Yi, Associate Professor of the Department of Civil and Environmental Engineering, and his team have developed a new water filter which has significantly advanced water purification technology. Their filters were first devised from a new two-dimensional nano material, graphene oxide (GO), which can be assembled into a membrane. Despite their outstanding separation performance, the membrane's instability limited its separation performance and long-term applications. To address this, the team developed a new 'magnetically ultra-stabilised GO-based membrane filter'. The filter not only exhibits effective separation performance, but also inactivates waterborne pathogens, making it suitable for many water purification applications.

Waste-Derived Biochar for Water Pollution Control and Sustainable Development

Biochar, derived from the combustion of biomass wastes, serves as a negative carbon emissions technology and is used to reduce pollutants. A team from the Department of Civil and Environmental Engineering has been examining its applications in treating municipal wastewater. They have found it efficient in targeting primary contaminants in industrial wastewater. When added to drainage systems, it can reduce the impact of stormwater and improve the erosion resistance and water retention capability of the structure. Biochar is thus a revolutionary means of water treatment, contributing to clean water and sanitation for a more sustainable ecosystem.

Natural Porous Materials for Interfacial Solar Steam Generation towards Clean Water Production

Researchers of the Department of Applied Physics and Materials Research Centre have been investigating the green solar-driven water vaporisation technology which was considered a sustainable solution to water shortages. They have reviewed the use of natural porous materials for vapour generation which could help ensure low-cost fresh water. It was found that the critical selection of evaporation material for successful vapour generation depended on various factors including optical absorption capacity, evaporation efficiency, stability and cost. The team argues for the development of a more efficient natural porous-based photothermal evaporator with high stability, recyclability and environmental compatibility that can be used on a large scale for practical applications.

Education

Water and Waste Treatment

Students from the Department of Applied Biology and Chemical Technology and the Department of Civil and Environmental Engineering can take subjects focusing on water management and waste treatment which introduce the requirements of water quality in relation to different sectors, different management and treatment methods of wastewater, and the kinetics involved. Aiming to help students develop an understanding of the general principles of water and waste treatment, control and management in Hong Kong, the courses' field visits, laboratory work and wastewater treatment plant design project provide students with first-hand information about and experience of the treatment of waste.

Subject: Surface Water Quality Modeling and Reactor System

With a focus on water quality control in relation to common water reactors, the subject, hosted by the Department of Civil and Environmental Engineering, aims to provide students with a clear understanding of the mechanisms leading to various types of water

quality behaviour, a rational basis for devising water quality control strategies, knowledge about the fundamental reaction kinetics, methods of analysing data collected from laboratory results, and the ability to critically analyse data and incorporate results into design solutions to real problems.



Engagement

Webinar on Advancing Wastewater Treatment

Organised by the Department of Civil and Environmental Engineering and in cooperation with the Research Centre for Resources Engineering towards Carbon Neutrality and the Hong Kong Institution of Engineers Civil Division, Dr Ling Leng, former Research Assistant Professor delivered an online seminar "Biotechnology Advances for Xenobiotics Degradation and Resource Recovery in Wastewater Treatment" on 27 July 2022. The seminar highlighted the progress having been made in wastewater treatment technology by integrating genomic analysis, machine learning and bioreactor engineering, with the goal to address challenges at the nexus of waste, energy, health, and carbon neutrality.



Policies and Operations

Water Conservation Policy

The University introduced a Water Conservation Policy in 2014 with the aim of saving water and implementing appropriate measures to ensure environmentally friendly campus development, operation and activity through incorporating water-saving features into all building designs and refurbishments, reusing grey water, minimising wastage through proper maintenance, and achieving quantifiable management goals. The Policy is also intended to enhance awareness within the University community of the need for water conservation.

Drinking Water Facilities

PolyU has installed drinking water fountains and water dispensers at over 20 convenient locations on campus to ensure drinking water is readily available and to encourage the refill of Bring Your Own (BYO) bottles and thus reducing plastic waste on campus. The web-based platform GreenMap@PolyU provides an easy way to locate these water stations. PolyU aims to keep the PolyU community hydrated while contributing to a more sustainable campus environment.

