School of Energy and Environment

香港城市大學



SEE Tech Talk Series on Waste as Resources

Date: 11 December 2021 (Saturday) Time: 10:00 am - 12:00 nn Format: Online via Zoom

(Zoom link will be provided to registrants)

Rundown:

10:00 - 10:05	Opening Remarks Dr. Yun Hau NG, Associate Professor
Presentations	
10:05 – 10:35	Transforming Lignocellulosic Waste for High-Value Products to Promote a Carbon-Neutral Economy Dr. Jason LAM. Assistant Professor
10:35 – 11:05	A Covid-19 Side Effect: Massive Release of Microplastics From Discarded Surgical Masks Potentially Poisoning Marine Organisms Dr. Henry HE, Assistant Professor
11:05 – 11:15	Break
11:15 – 11:45	Sustainable Waste Management and Waste to Energy Dr. Lin ZHANG, Assistant Professor
11:45 –12:00	Q&A Session
12:00	End of Event

All are Welcome!



Please scan QR code to register Registration deadline: 8 December 2021 (Wednesday)

Abstracts and Speakers

Transforming Lignocellulosic Waste for High-Value Products to Promote a Carbon-Neutral Economy

Dr. Jason LAM, Assistant Professor

<u>Abstract</u>

By 2050, Hong Kong and many parts of the world have pledged to decouple with fossil resources as part of the climate change mitigation action. As we begin to fulfil our energy need with green H₂ and other promising renewable energy sources, then what about our chemical demands? Lignocellulosic Biomass is the most abundant, and the only, renewable carbon source. Catalytic valorisation of lignocellulosic biomass for chemical and fuel production thus serves as an important strategy to address our carbon-neutral goal towards a sustainable future.

This talk aims to introduce and discuss how lignocellulosic biomass can address our mission towards our sustainable goals. We will identify and discuss some of the possible biomass-resources that can be gathered in Hong Kong, and the possible technologies that are applicable to transform them for chemical or liquid carbon-neutral fuel production.

A Covid-19 Side Effect: Massive Release of Microplastics From Discarded Surgical Masks Potentially Poisoning Marine Organisms

Dr. Henry HE, Assistant Professor

<u>Abstract</u>

Surgical masks (SMs) are the most commonly used personal protection equipment during the COVID-19 pandemic. Due to their vast application and inappropriate disposal worldwide, SMs could potentially bring a serious pollution of microplastics (MPs) into coastal marine environment. This study aimed to investigate the kinetic release of MPs from polypropylene SMs (PP-SMs) in seawater and evaluate the chronic toxicity of the released MPs to the marine copepod Tigriopus japonicus. Based on the kinetic study results and available relevant data, we estimated that SMs discarded throughout the year 2020 would lead to over 137 trillion MPs entering the coastal marine environment globally. This is equivalent to seriously polluting over 6000 Olympic swimming pool every year. Our results also demonstrated that the copepods ingested the MPs released from PP-SMs, causing a significant decline in their fecundity. Marine copepods are primary heterotrophic zooplankton that play an important role in the energy transfer of the ecosystem. The results evidently suggested the MPs released from improperly discarded SMs could pose a long-term domino effect on coastal marine ecosystems. To minimize the risk of this emerging threat, better environmental management, policy and law enforcement for ensuring proper disposal of SMs are deemed to be necessary.



Sustainable Waste Management and Waste to Energy

Dr. Lin ZHANG, Assistant Professor

<u>Abstract</u>

The increasing amount of municipal solid waste (MSW) is not only a challenge to our society, but also an opportunity for regional sustainable development. We estimate the energy potential of waste through two different waste disposal methods, landfills and incineration, by the years 2030 and 2060, using the Greater Bay Area of China as an example. Also, we estimate the carbon dioxide emission reductions by energy recovery through the two disposal methods. Our results show that the maximum potential of electricity production from MSW for the GBA could reach 31,346 GWh by 2030 and 77,748 GWh by 2060. Based on these results, we discuss the differences in energy generation efficiency among cities and offer advice to policy makers to mitigate the gap. We suggest that incineration is preferrable to landfills from aspects of both energy recovery and climate concerns. Furthermore, municipal governments should accelerate waste classification to lower the heating value of MSW in order to increase efficiency.



