INVITATION

Conférences : Transformation Thermochimique de la Biomasse. Thermochemical Transformation of Biomass.

IUT Épinal-Hubert Curien, mercredi 18 juin, 15h00, 2025
Présentiel ou visio-conférence

Link TEAMS :
https://teams.microsoft.com/l/meetup-join/19%3ameeting_YTBmYWViMTItNzZjZC00ZWQ0LWIzZmItNWE3ZTc3ZGJlZjM5%40thread.v2/0?context=%7b%22Tid%22%3a%22158716cf-46b9-48ca-8c49-c7bb67e575f3%22%2c%22Oid%22%3a%224226ed8d-9a7f-4287-ae33-d0d0d9889ce2%22%7d

Pr. Wei-Hsin CHEN, National Cheng Kung University, TAIWAN

Spent coffee grounds valorization for circular bioeconomy

Coffee is one of the most popular beverages worldwide, with global consumption reportedly reaching 170.3 million 60-kg bags in the 2021/2022 season. Global coffee consumption is expected to continue increasing. Due to this high consumption, a large amount of spent coffee grounds (SCGs) is generated. SCGs are a significant waste product that, if not properly managed, can lead to environmental pollution. However, through various conversion or biorefinery processes, SCGs can be transformed into valuable resources, such as fuels and materials. **Torrefaction** is a low-temperature thermal degradation process for biomass that can produce solid biofuels (biochar) and biobased materials. After pyrolysis treatment, the higher heating value (HHV) of SCGs, which is about 22 $MJ \cdot kg^{-1}$, can be further increased (up to approximately 27 $MJ \cdot kg^{-1}$ with additive blending during pyrolysis), making them suitable as coal-like fuels. In addition to improved energy content, the properties of SCGs are also enhanced. As a result, modified SCGs can be used for **pollutant removal**, such as marine oil spills and dyes, helping to mitigate environmental pollution. The carbon content in torrefied SCGs is significantly increased, making them potential **alternatives to carbon black** in polymers and masterbatches, as well as materials for **construction coatings and insulation bricks**. When used as construction materials, the carbon in SCGs is sequestered rather than emitted into the atmosphere, thereby contributing to **negative carbon technologies** and the **circular bioeconomy**.

- Biography :

Professor Wei-Hsin Chen is a Distinguished Professor at the Department of Aeronautics and Astronautics, National Cheng Kung University (NCKU), Taiwan. He is also a Honorary Chair Professor at Tunghai University, a Chair Professor at the National Chin-Yi University of Technology, a Research Fellow of the National Science and Technology Council, Taiwan, Vice President of the Institute for Liquid Atomization and Spray Systems-Asia (ILASS-Asia), and Director of Energy Industry Talent Education Center, NCKU, Taiwan. He received his Ph.D. from the Institute of Aeronautics and Astronautics, National Cheng Kung University in 1993. He was a visiting professor at Princeton University, USA; the University of New South Wales, Australia; the University of Edinburg, UK; the University of British Columbia, Canada; the University of Lorraine, France; and RWTH Aachen University, Germany. He was also an invited lecturer at the University of Lorraine. His research interests include hydrogen energy, bioenergy, clean energy, carbon capture and utilization, and atmospheric science. He has published over 610 peer-reviewed journal papers with a h-index of 91 (Scopus). He is the Editor-in-Chief, Section Editor-in-Chief, Editor, Associate Editor, and Editorial Board Member of several prestigious journals. He also serves as a Guest Editor of over 20 SCI-indexed journals. In recent years, his important awards include Outstanding Research Award (National Science and Technology Council, Taiwan), Highly Cited Research and Review Paper Awards (Applied Energy, Elsevier), Outstanding Engineering Professor Award (Chinese Institute of Engineers), Highly Cited Review Article Award (Bioresource Technology, Elsevier), TECO Award, and seven consecutive years (2016-2022) Clarivate Analytics (Web of Science) Highly Cited Researcher Award.