Sujet : CEE 269C EnvEng Seminar: Monday, April 4 at 12:15pm - Ange Nzihou "The Production of Hydrogen from Biomass, Biowaste and Water: Sustainable?"
De : Jack Chiueh <jchiueh@stanford.edu>
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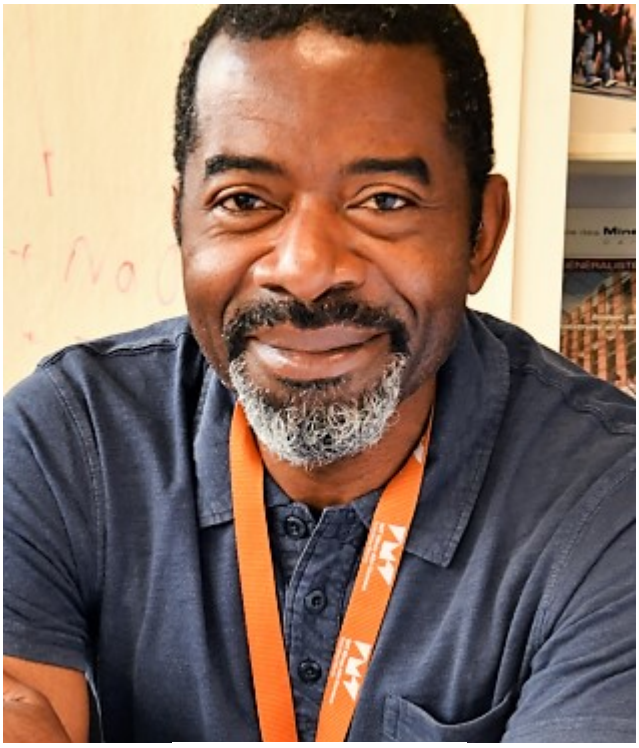
Monday, April 4, 2022
12:15pm - 1:15pm (Pacific Time)

on Zoom Video Conference
https://stanford.zoom.us/j/94341540443?pwd=WFZ6WTIrcHIwYUh0clJsaExQdGR5Zz09
(Meeting ID: 943 4154 0443 and Passcode: 611189)

The Production of Hydrogen from Biomass, Biowaste and Water: Sustainable?



Ange Nzihou

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Abstract

Hydrogen is currently within an unprecedented political and business momentum, with the number of initiatives, projects and policies around the world expanding rapidly. Hydrogen is a versatile energy carrier (not an energy source) that can be produced from various energy sources and technologies. It can be transformed into electricity and methane to power homes and feed industry, and into fuels for cars, trucks, ships, and planes. Hydrogen can help tackle various critical energy challenges such as the decarbonization of a wide range of sectors, including transport, chemicals, and iron and steel industries where it is challenging to meaningfully reduce emissions.

Out of water, no greenhouse gases, particulates, Sulphur oxides or ground level ozone are emitted from the use of hydrogen as energy vector. Nevertheless, hydrogen can have a high CO2 intensity upstream if produced from fossil fuels such as coal, oil or natural gas. This disadvantage can only be overcome by using renewables or nuclear as the initial energy input, or equipping fossil fuel plants with Carbon capture, utilization, and storage (CCUS). It is time now to scale up technologies and bring down costs to favor a wider use of hydrogen.

While important issues related to storage capacity, policy and technology uncertainty, value chain complexity and infrastructure, regulations, standards, and acceptance are still to be addressed, I intend in my lecture and discussion with you to rather focus on availability of feedstocks (water and biomass), scientific and technology challenges as well as the economic and environmental relevance of two solutions, namely electrolysis of water and pyrolysis and gasification of biomass. In each case, crucial resources (water or biomass) are used with potential impacts. This comes with challenges and questions on whether these hydrogen production routes are sustainable on the global standpoint.

Bio

Ange Nzihou is a Distinguished Professor of Chemical Engineering at the RAPSODEE Research Center-CNRS, Institut Mines Telecom, IMT Mines Albi (France). He is currently a Fulbright Visiting Professor at Princeton University (USA). He holds Visiting Professor positions at Zhejiang University (China) and Mahatma Gandhi University (India). He is the Editor-in-Chief of the Journal "Waste and Biomass Valorization" (Springer Nature) and the Editor of the Handbook on “Characterization of Biomass, Biowaste and related By-products” (Springer Nature). He is a laureate of the Grand Prix of the Academy of Sciences of France (2018) for his outstanding contribution to the progress in science of energy conversion.

His main research fields and expertise are energy and added-value materials from biomass and waste; bioresources to hydrogen and syngas production, biochar and biographene; elaboration, functionalization of carbon and phosphate-based composites / hybrid materials (sorbents, catalysts, energy carriers, sensors) for energy and depollution; thermochemical processes (pyrolysis, gasification, reforming); Behavior of pollutants such as heavy metals and aerosols (fine particles).