OCEESA

Webinar for Overseas Chinese Environmental Engineers & Scientists Association

海外華人環境保護學會環境議題網上論壇(二)

Key Environmental Issue Webinar
Section 2
December 6th, 2020, 6:00-7:30 PM PST
December 7th, 2020,10:00-11:30 AM CST

Registration

Electrocatalytic Upgrading of Biomass to Value-added Platform Chemicals and Fuels

Biomass fast pyrolysis liquid (aka bio-oil) has been long regarded as one of the most promising renewable carbon feedstocks. However, freshly pyrolyzed bio-oil is acidic and corrosive containing large quantities of carbonyl and phenolic compounds that polymerize under acidic conditions. This presentation talks about an electrochemical strategy to hydrogenate the carbonyl groups using only earth abundant metal catalysts. The resulting upgraded biofuel benefits from greater stability and higher specific energy. In addition to chemical significance, this talk will also discuss why electrocatalysis is a technique in the biofuel circle.

Dr. Chun Ho (Jason) LAM
Assistant Professor, School of Energy and Environment, City University of Hong Kong

Being joining CityU as an assistant professor, Dr. Jason Lam was a postdoctoral fellow at Yale University and a visiting assistant professor at Wesleyan University. His research interests revolve around transforming biomass to platform chemicals through electrocatalysis. One of his recent projects was to develop an electrocatalytic protocol to convert crude glycerol into lactic acid for biodegradable plastics manufacturing. Both his graduate and postdoctoral work are published in Green Chem., Angew. Chem. Int. Ed., ChemSusChem, and other peer-reviewed journals.
Outside of lab work, Dr. Lam is also an educator and an environment enthusiast. He has mentored numerous undergraduate and graduate researchers throughout his academic appointments. Dr. Lam has also been invited to design and teach a certificate program on the practice of green chemistry to professional students for the University of Washington's Continuing Education Programs.

Efficient and Stable Photoelectrochemistry of Hybrid Materials

Here we demonstrate that methylammonium cadmium halides show photoelectrochemical (PEC) response with excellent humidity and chemical resistance because the oxidation state of almost all cadmium compounds is +2. The photocurrent densities of two-dimensional 2D layered $(MA)_2CdCl_4$ perovskites are 0.30 $mAcm^{-2}$ under 100 $mWcm^{-2}$ irradiation. It is shown that H_2O is able to complex with the perovskite, forming a hydrate product with the molecular formula of MACd3Cl7•3H2O upon humidity exposure. This causes a decrease in absorption and recognizable change in crystal structure of the material. When compared to methyl-ammonium lead iodide ($MAPbI_3$), the PEC stability of 2D layered $(MA)_2CdCl_4$ perovskites with $BQ/BQ^{\bullet -}$ redox couples (where BQ is benzoquinone) in CH_2Cl_2 is enhanced from 50 hours to 600 hours, exhibiting an increase of 12 times.

Dr. Hsien-Yi (Sam) HSU
Assistant Professor, School of Energy and Environment, City University of Hong Kong

Dr. Sam Hsu obtained his PhD degree at University of Florida with focusing on photophysical behaviors of functional metallopolymer materials for solar energy and optoelectronic applications. After that, he received the two-year postdoctoral and research associate's appointments respectively with Prof. Allen J. BARD and Prof. Edward T. YU in Center for Electrochemistry as well as Department of Electrical and Computer Engineering at University of Texas at Austin. During the period of his postdoc and research associate, he completed many outstanding multidisciplinary projects. The area of his expertise stretches from material design to new related disciplines involving material characterization and diverse applications, such as solar fuels, organic and inorganic photovoltaic cells, wastewater treatment and waste management.