

# Materials Seminar

## Professor Yujie Sun

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Department of Chemistry

*“Inexpensive Catalysts for Hydrogen  
Electrochemistry and Alcohol Oxidants”*



One of the challenges in realizing large-scale H<sub>2</sub> production and utilization in a green manner is the lack of competent and inexpensive electrocatalysts. Our group recently discovered that interfacial engineering of metals and metal nitrides resulted in a class of interesting electrocatalysts that exhibit superior activities for hydrogen electrochemistry, including H<sub>2</sub> evolution from water electrolysis and hydrogen oxidation, rivaling the performance of the state-of-the-art platinum-based electrocatalysts. Systematic electrochemical and computational studies were conducted to shed light on the active sites which are located at the interface between metals and metal nitrides. The second part of my presentation will be devoted to our recent investigation in electrocatalytic oxidation of alcohols, most of which are derived from biomass materials. Not only replacing the anodic O<sub>2</sub> evolution reaction in water splitting electrolysis, oxidation of some biomass-derived alcohols is able to produce critical moieties for pharmaceutical synthesis. For instance, we discovered that immobilized polymeric nickel electrocatalysts would drive both of the dehydrogenation of furfural alcohol to furfural as well as its Achmatowicz reaction to yield 5-hydroxy-5,6-dihydro-2H-pyran-2-one, whose selectivity could be controlled by applied potential, manifesting the advantage of electrocatalysis.

Host: Prof. Kyoung-Shin Choi

Thursday  
February 28, '19

12:15 p.m.  
1315 Chemistry

Coffee & cookies  
at 12 p.m.



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