Prof. Yu-Chuan Lin

林裕川 教授

Ph.D.： Chemical Engineering, Kansas State University

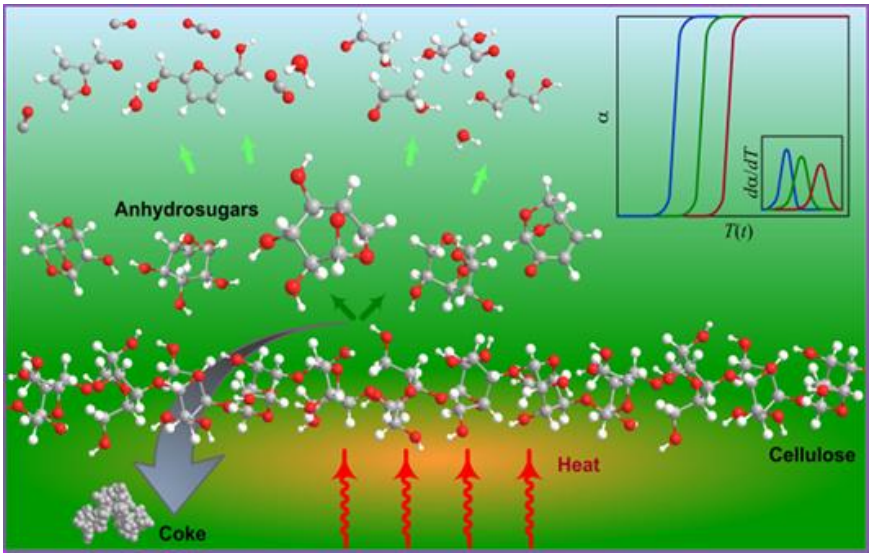
Email： yclin768@mail.ncku.edu.tw
Phone： +886-6-2757575 ext 62668
Office： Room No.93915 (9F)

Research Interests

The objective of our team is to investigate novel catalytic routes for fuels and chemicals preparation. Currently, we focus on converting renewable resources such as lignocellulosic biomass and biomass-derived alcohols to high grade fuels and chemicals by heterogeneous catalysis. Catalytic fast pyrolysis, partial oxidation, and hydrotreating are three main routes being employed in our lab. All of these approaches rely on our understandings and developments of heterogeneous catalysis. Hence, topics of the basic knowledge and applications of heterogeneous catalysis are studied, too. There are three main routes investigated currently: 1) lignocellulosic biofuels and chemicals preparation, 2) hydrogen and syngas generation, and 3) heterogeneous catalysis and reaction engineering.

Representative Publications

1. Hou, Y.-C.; Ding, M.-W.; Liu, S.-K.; Wu, S.-K.; Lin, Y.-C.*, Ni-substituted LaMnO3 perovskites for ethanol oxidation. RSC Advances 2014, 4 (11), 5329-5338.
2. Liu, S.-K.; Lin, Y.-C.*, Generation of syngas through autothermal partial oxidation of glycerol over LaMnO3- and LaNiO3-coated monoliths. Catalysis Today 2014, 237, 62-70.
3. Wu, S.-K.; Lai, P.-C.; Lin, Y.-C.*; Wan, H.-P.; Lee, H.-T.; Chang, Y.-H., Atmospheric Hydrodeoxygenation of Guaiacol over Alumina-, Zirconia-, and Silica-Supported Nickel Phosphide Catalysts. ACS Sustainable Chemistry & Engineering 2013, 1(3) 349-358.
4. Jiang, B.-S.; Chang, R.; Lin, Y.-C.*, Partial Oxidation of Ethanol to Acetaldehyde over LaMnO3-Based Perovskites: A Kinetic Study. Industrial & Engineering Chemistry Research 2013, 52 (1), 37-42.
5. Lin, Y.-C.*, Catalytic Valorization of Glycerol to Hydrogen and Syngas. International Journal of Hydrogen Energy 2013, 38, 2678-2700.
6. Fanchiang, W.-L.; Lin, Y.-C.*, Catalytic fast pyrolysis of furfural over H-ZSM-5 and Zn/H-ZSM-5 catalysts. Applied Catalysis A: General 2012, 419-420, 102-110.
7. Lin, Y.-C.*; Li, C.-L.; Wan, H.-P.; Lee, H.-T.; Liu, C.-F., Catalytic Hydrodeoxygenation of Guaiacol on Rh-Based and Sulfided CoMo and NiMo Catalysts. Energy & Fuels 2011, 25 (3), 890-896.
8. Li, C.-L.; Wang, C.-L.; Lin, Y.-C.*, Pd-integrated Lanthanum-Transition Metal Perovskites for Methanol Partial Oxidation. Catalysis Today 2011, 174 (1), 135-140.
9. Li, C.-L.; Lin, Y.-C.*, Methanol Partial Oxidation over Palladium-, Platinum-, and Rhodium-Integrated LaMnO3 Perovskites. Applied Catalysis B: Environmental 2011, 107 (3-4), 284-293.
10. Hohn, K. L.; Lin, Y.-C.*, Catalytic Partial Oxidation of Methanol and Ethanol for Hydrogen Generation. ChemSusChem 2009, 2 (10), 927-940.

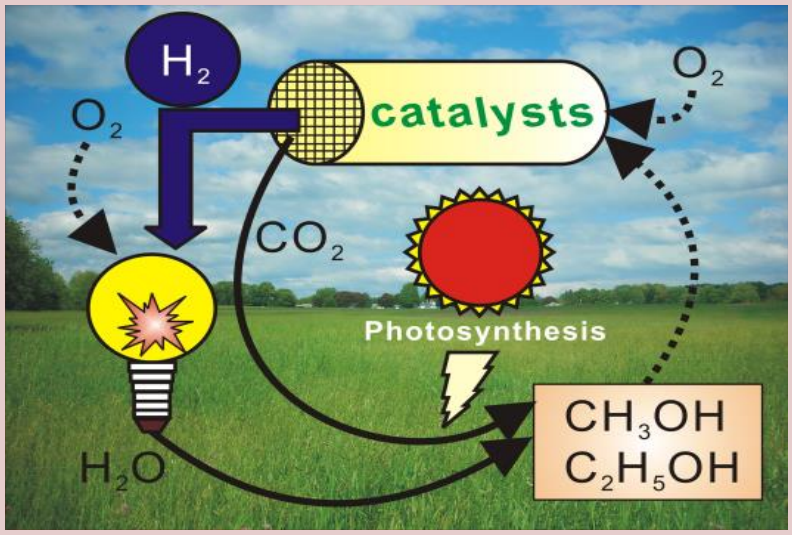


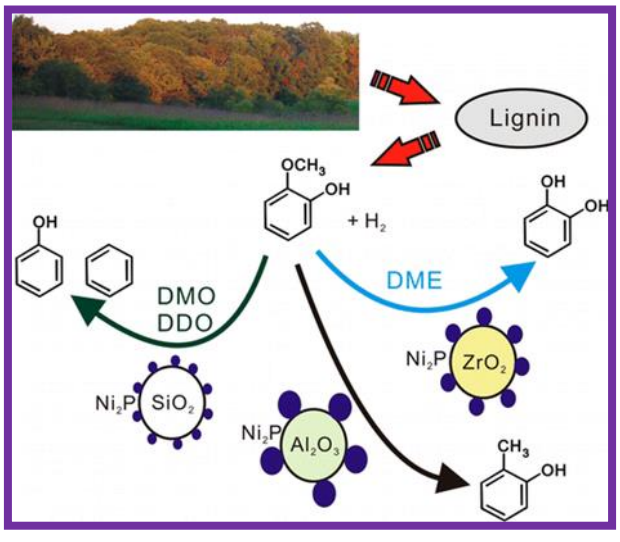
Kinetics and mechanism of cellulose pyrolysis (Lin et al., JPCC, 2009)

This work investigates reaction mechanism and kinetics of cellulose pyrolysis. Oxygenated, anhydrosugars, and furans are major intermediates; thermal lag effect plays a key role during pyrolysis for kinetic evaluation.

Green hydrogen generation cycle (Hohn and Lin, ChemSusChem, 2009).

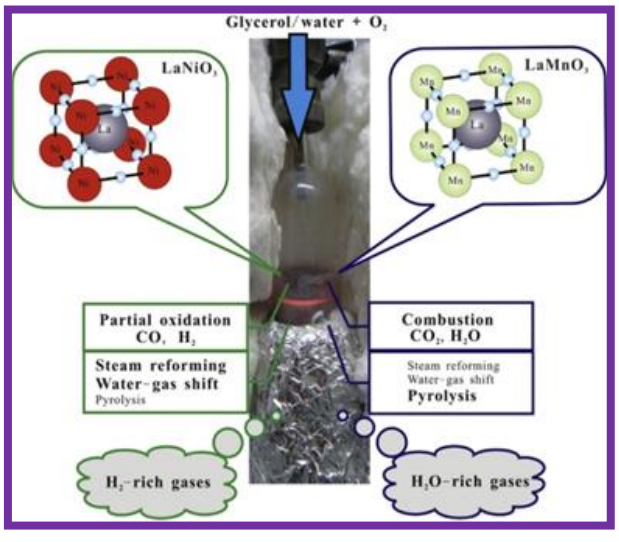
This review discusses mechanism, chemistry of catalyst, and the state-of-the-art characterization technologies for C1 and C2 alcohols partial oxidation to hydrogen and syngas. It also points out a possibility to provide a green-cycle of hydrogen production.





Selective hydrodeoxygenation of guaiacol over Ni_2P-based catalysts (Wu et al., ACS Sustainable Chem. Eng., 2013)

Active phase-support interaction is important to tune the reaction pathway.



Autothermal reforming of glycerol to syngas (Liu and Lin, Catal. Today, 2014)

Glycerol can be convert into syngas at millisecond contact time via perovskite catalysts.