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Biomass Electrochemistry : from cellulose to sorbitol

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Propositions

accompanying the thesis

Biomass Electrochemistry: from cellulose to sorbitol

1. Lack of references brings us more chances to make a big impact and to open a new research field.
2. Online HPLC provides the best way to study multiple electron transfer reactions in aqueous media by collecting samples during voltammetry and subsequent analysis in chromatographic techniques.

Chapter 2 of this thesis

3. Carbon monoxide (CO) plays an important role in electrocatalysis. CO on Pt leads to the primary alcohol oxidation during glycerol oxidation unless it is blocked by adatoms (i.e. Bi, Sb etc.) which oxidize glycerol through secondary alcohol.

Chapter 2, 3, 4 of this thesis

4. Is carbon monoxide a poisoning species? CO is a promoter for methanol oxidation on Au in alkaline media.

Paramaconi Rodriguez et al. Nature Chemistry, 2012, 4, 177.

5. Gold is an extremely active catalyst in alcohol oxidation, provided the pH is high enough (pH > 13).

Chapter 5 of this thesis

6. Electrocatalysis is not a good option for cellulose hydrolysis to glucose. However hydrogen storage in glucose is controllable.

Chapter 6, 7 of this thesis

7. We have to redefine the role of the catalyst. Solid metal catalysts do not change the reaction rate, but only control the reaction pathway during the hydrogenation of 5-hydroxymethylfurfural (HMF).

Chapter 8 of this thesis

8. Selective conversion between isomers is a big challenge in catalysis. No one completely converts glucose to fructose.

9. Everybody is a genius. But if you judge a fish by its ability to climb a tree, it will live its whole life believing that it is stupid. – *Albert Einstein* –
As far as we climb a tree named ‘Science’, it is difficult to be not stupid.
10. Aristotle said that patience is bitter, but its fruit is sweet. However, sometimes this is not true.

Youngkook Kwon
5 September, 2013