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RESEARCH INTERESTS

Electrocatalysis for water splitting and CO_2 reduction

- Materials chemistry & characterization
- Surface modification
- Hydrogen generation and uptake
- Electrochemical sensors
- Synthesis of metallic alloy nanostructures

SUMMARY

My PhD research focused on electrochemistry, nanomaterials and its applications. I have developed novel and sensitive electrochemical sensors via functionalization electrode for biomarker detection. In the second part, functionalized gold nanoparticles, functionalized MWCNT and N-doped graphene and their electrochemical application were also studied. In addition, via electrochemical deposition, an ultra-high surface area electrode of 3D nanodendrite porous structure of Au, Ag or Cu were successfully synthesized on the electrode. And a forest of tunable composition of tri-metallic Pt-Au-Ag nanodendrite was synthesized via galvanic replacement reaction of Pt and Au.

During two years postdoctoral in the group of Dr. Vincent Artero, CEA, Grenoble, I worked on the project of "Ni-based catalyst ($[Ni(P^{Cy}_2N^{ester}_2)_2](BF_4)_2$ complex) grafted on MWCNT/GDL for H_2 generation and uptake" & "composite of Cu electrodeposited from $[Cu(cyclam)]^{2+}$ complex for selective electro-reduction of CO_2".

From September 2015 to present, I work in the lab of Prof. Marc Fontecave at Collge de France. my research interests are focused on developing of a flow electrolyzer for high efficieny electrochemical reduction of CO_2.

PUBLICATIONS

1. Carbon Nanotube supported Copper Polyphthalocyanine for Efficient and Selective Electrocatalytic CO2 Reduction to CO

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3. Electroreduction of CO2 on Single- Site Copper- Nitrogen- Doped- Carbon Material: Selective Formation of Ethanol and Reversible Restructuration of the Metal Sites
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4. Copper-Substituted NiTiO3 Ilmenite-Type Materials for Oxygen Evolution Reaction
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   Angewandte Chemie – 56 (2017), 4792-4796

10. “Electrochemical reduction of CO2 catalyzed by Fe-N-C materials: a structure-selectivity study”
    Tran Ngoc Huan, Nastaran Ranjbar, Gwenaëlle Rousse, Moulay Sougrati, Andrea Zitolo, Victor Mougel, Frédéric Jaouen, Marc Fontecave
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11. “Porous dendritic copper: an electrocatalyst for highly selective CO2 reduction to formate in water/ionic liquids electrolyte”
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    Kim, S., Tran Ngoc Huan, Kim, J., Yoo, S.Y., Chung, H.
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