

## Dr. TRAN Ngoc Huan

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## RESEARCH INTERESTS

### Electrocatalysis for water splitting and CO<sub>2</sub> reduction

- Materials chemistry & characterization
- Surface modification
- Hydrogen production and uptake
- High energy efficiency electrolyzer for CO<sub>2</sub> conversion

## SUMMARY

I did my PhD under the supervision of Prof. Hoeil Chung at Chemistry department, Hanyang University, Seoul, South Korea. During my PhD, I focused on electrochemistry, nanomaterials and their applications analytical chemistry. We 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 are also studied. In addition, via electrochemical deposition, an ultra-high surface area electrode of 3D nanodendrite porous structure of Au, Ag or Cu are also synthesized for different application in Raman and electrochemical analysis.

During two years postdoctoral research in the group of Dr. Vincent Artero, CEA, Grenoble, I worked on the project of “Ni-based catalyst ([Ni(PCy<sub>2</sub>N<sup>ester</sup><sub>2</sub>)<sub>2</sub>](BF<sub>4</sub>)<sub>2</sub> complex) grafted on MWCNT/GDL for H<sub>2</sub> generation and uptake” & “composite of Cu electrodeposited from [Cu(cyclam)]<sup>2+</sup> complex for selective electro-reduction of CO<sub>2</sub>”.

From September 2015, I worked in the lab of Prof. Marc Fontecave at Collge de France as a postdoctoral researcher and became a permanent research member from January 2018. My research interests are focusing on developing of electrocatalysts and electrolyzers for high energy efficiency conversion of CO<sub>2</sub> to valuable products, such as: CO, formica cid, ethylene and ethanol.

## PUBLICATIONS

### 2021

- Coupling Electrocatalytic CO<sub>2</sub> Reduction with Thermocatalysis Enables the Formation of a Lactone Monomer  
L Ponsard, E Nicolas, NH Tran, S Lamaison, D Wakerley, T Cantat, Fontecave M

**ChemSusChem 2021, 14 (10), 2198-2204**

- Benchmarking of oxygen evolution catalysts on porous nickel supports  
A Peugeot, CE Creissen, D Karapinar, HN Tran, M Schreiber, Fontecave M  
**Joule 2021, 5 (5), 1281-1300**
- Impact of ionomer structuration on the performance of bio-inspired noble-metal-free fuel cell anodes  
N Coutard, B Reuillard, TN Huan, F Valentino, RT Jane, S Gentil, A Vincent  
**Chem Catalysis 2021, 1, 88-105**

**2020**

- Immobilization of a Molecular Re Complex on MOF-derived Hierarchical Porous Carbon for CO<sub>2</sub> Electroreduction in Water/Ionic Liquid Electrolyte  
D Grammatico, HN Tran, Y Li, S Pugliese, L Billon, BL Su, M Fontecave  
**ChemSusChem 2020,13 (23), 6418-6425**
- Functionalization of Carbon Nanotubes with Nickel Cyclam for the Electrochemical Reduction of CO<sub>2</sub>  
S Pugliese, NT Huan, J Forte, D Grammatico, S Zanna, BL Su, Y Li, Marc F  
**ChemSusChem 2020, 13 (23), 6449-6456**

**2019**

- Carbon Nanotube supported Copper Polyphthalocyanine for Efficient and Selective Electrocatalytic CO<sub>2</sub> Reduction to CO  
Karapinar D, Zitolo A, Ngoc Huan T, Taverna D, Galvao Tizei LH, Zanna S, Mougel V, Giaume D, Marcus P, Fontecave M.  
**ChemSusChem, 2019, DOI: 10.1002/cssc.201902859**
- FeNC catalysts for CO<sub>2</sub> electroreduction to CO: effect of nanostructured carbon supports  
D. Karapinar, Ngoc-Huan Tran, D. Giaume, N. Ranjbar, F. Jaouen, V.Mougel, M. Fontecave  
**Sustainable Energy Fuels, 2019, 10.1039/c9se00214f**
- Electroreduction of CO<sub>2</sub> on Single-Site Copper-Nitrogen-Doped-Carbon Material: Selective Formation of Ethanol and Reversible Restructuration of the Metal Sites  
D. Karapinar, T. N. Huan, N. Ranjbar, J. Li, D. Wakerley, N. Touati, S. Zanna, D. Taverna, L. H. Galvão Tizei, A. Zitolo, F. Jaouen, V. Mougel, M. Fontecave  
**Angew. Chem. Int. Ed., 2019, DOI: 10.1002/anie.201907994**
- Copper-Substituted NiTiO<sub>3</sub> Ilmenite-Type Materials for Oxygen Evolution Reaction  
A Guiet, TN Huan, C Payen, F Porcher, V Mougel, M Fontecave, G Corbel  
**ACS applied materials & interfaces 2019, 11 (34), 31038-31048**
- Controlling Hydrogen Evolution during Photoreduction of CO<sub>2</sub> to Formic Acid Using [Rh(R-bpy)(Cp\*)Cl]<sup>+</sup> Catalysts: A Structure–Activity Study  
TK Todorova, TN Huan, X Wang, H Agarwala, M Fontecave  
**Inorg. Chem. 2019, 58(10) 6893-6903**
- Low-cost high-efficiency system for solar-driven conversion of CO<sub>2</sub> to hydrocarbons  
Tran Ngoc Huan, Daniel Alves Dalla Corte, Sarah Lamaison, Dilan Karapinar, Lukas Lutz, Nicolas Menguy, Martin Foldyna, Silver-Hamill Turren-Cruz, Anders Hagfeldt, Federico Bella, Marc Fontecave, and Victor Mougel  
**PNAS May 14, 2019 116 (20) 9735-9740**
- Zn–Cu Alloy Nanofoams as Efficient Catalysts for the Reduction of CO<sub>2</sub> to Syngas Mixtures with a Potential-Independent H<sub>2</sub>/CO Ratio  
Sarah Lamaison, David Wakerley, David Montero, Gwenaëlle Rouse, Dario Taverna, Domitille Giaume, Dimitri Mercier, Juliette Blanchard, Huan Ngoc Tran, Marc Fontecave, Victor Mougel  
**ChemSusChem 12 (2019) 511-517**

## 2017

- Pt Immobilization within a Tailored Porous–Organic Polymer–Graphene Composite: Opportunities in the Hydrogen Evolving Reaction  
Ahmed Soliman, Mohamed Hassan, Tran Ngoc Huan, Arwa Abugable, Worood Elmehalmey, Stavros Karakalos, Manuel Tsotsalas, Marita Heinle, Mady Elbahri, Marc Fontecave, Mohamed Alkordi  
**ACS Catalysis 7 (2017), 7847-7854**
- A Dendritic Nanostructured Copper Oxide Electrocatalyst for the Oxygen Evolution Reaction  
Tran Ngoc Huan, Gwenalle Rousse, Sandrine Zanna, Ivan T. Lucas, Xiangzhen Xu, Nicolas Menguy, Victor Mougel, Marc Fontecave  
**Angewandte Chemie – 56 (2017), 4792-4796**
- Electrochemical reduction of CO<sub>2</sub> 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  
**ACS Catalysis 7 (2017), 1520-1525**
- Porous dendritic copper: an electrocatalyst for highly selective CO<sub>2</sub> reduction to formate in water/ionic liquids electrolyte  
Tran Ngoc Huan, P. Simon, G. Rousse, I. Génois, V. Artero, M. Fontecave  
**Chemical Science 8 (2017), 742-747**

## 2016

- CO<sub>2</sub> reduction to CO in water: carbon nanotube-gold nanohybrid as a selective and efficient electrocatalyst  
Tran Ngoc Huan, P. Prakash, P. Simon, G. Rousse, X. Xiangzhen, V. Artero, E. Gravel, E. Doris, M. Fontecave  
**ChemSusChem 9 (2016), 2317-2320**
- Bio-inspired Nanomaterials Approaching Pt Performances for H<sub>2</sub> Evolution and Uptake  
Tran Ngoc Huan, Reuben T. Jane, A. Benayad, Laure Guetaz, Phong. D. Tran, Vincent Artero  
**Energy Environmental Science 9 (2016), 940-947.**
- Cu/Cu<sub>2</sub>O electrodes and CO<sub>2</sub> reduction to formic acid: Effects of organic additives on surface morphology and activity  
Tran Ngoc Huan, Philippe Simon, Anass Benayad, Laure Guetaz, V. Artero, M. Fontecave  
**Chemistry-A European Journal 22 (2016), 14029-14035**

## 2015

- Toehold-mediated DNA displacement-based surface-enhanced Raman scattering DNA sensor utilizing an Au-Ag bimetallic nanodendrite substrate  
Kim, S., Tran Ngoc Huan, Kim, J., Yoo, S.Y., Chung, H.  
**Analytica Chimica Acta 885 (2015) 132–139**
- From molecular copper complexes to composite electrocatalytic materials for selective reduction of CO<sub>2</sub> to formic acid  
Tran Ngoc Huan, Eugen. S. Andreiadis, Jonathan Heidkamp, Philippe Simon, Saioa Cobo, Guy Royal, Holger Dau, Vincent Artero and Marc Fontecave  
**Journal of Materials Chemistry A 3 (2015), pp. 3901-3907**
- Forest of Pt-Au-Ag tri-metallic nanodendrites as an efficient electrocatalyst for methanol oxidation reaction  
Tran Ngoc Huan, Dipak V. Shinde, Sung-Hwan Han, Vincent Artero, Hoeil Chung  
**RSC Advances 5 (2015) 6940-6944**

## 2014

- Au–Ag bimetallic nanodendrite synthesized via simultaneous co-electrodeposition and its application as a SERS substrate  
Tran Ngoc Huan, Saetbyeol Kim, Pham Van Tuong and Hoeil Chung  
**RSC Advances 4 (2014) 3929-3933**

## 2013

- Direct production of highly conductive graphene with a low oxygen content by a microwave-assisted solvothermal method  
Tran Van Khai, Dong Sub Kwak, Yong Jung Kwon, Tran Ngoc Huan, Hoeil Chung, Chongmu Lee, Hyoun Woo Kim  
**Chemical Engineering Journal 232 (2013) 346–355**
- Current density enhancement in ZnO/CdSe photoelectrochemical cells in the presence of a charge separating SnO<sub>2</sub> nanoparticles interfacing-layer  
Supriya A. Patil, Dipak V. Shinde, Sambhaji S. Bhande, Tran Ngoc Huan, Rajaram S. Mane and Sung-Hwan Han  
**Dalton Transactions 42 (2013) 13065-13070**
- Label-free detection of aflatoxin M1 with electrochemical Fe<sub>3</sub>O<sub>4</sub>/polyanilinebased aptasensor  
Binh Hai Nguyen, Lam Dai Tran, Quan Phuc Do, Huy Le Nguyen, Tran Ngoc Huan, Phuc Xuan Nguyen  
**Materials Science and Engineering C 33 (2013) 2229–2234**

## 2012

- Spirally oriented Au microelectrode array sensor for detection of Hg (II)  
Tran Ngoc Huan, Le Quoc Hung, Vu Thi Thu Ha, Tran V. Khai, Kwang Bo Shim, Hoeil Chung.  
**Talanta 94 (2012) 284– 288**
- Enhancement of quaternary nitrogen doping of graphene oxide via chemical reduction prior to thermal annealing and an investigation of its electrochemical properties  
Tran Ngoc Huan, Tran Van Khai, Kwang Bo Shim, Hoeil Chung  
**Journal of Materials Chemistry 22(2012) 14756-14762**

## 2011

- A three-dimensional gold nanodendrite network porous structure and its application for an electrochemical sensing  
Tran Ngoc Huan, Thothadri Ganesh, Kwang Soo Kim, Sung-Hwan Han, Hoeil Chung  
**Biosensors and Bioelectronics 27 (2011) 183– 186**
- Sensitive detection of an Anthrax biomarker using a glassy carbon electrode with a consecutively immobilized layer of polyaniline/carbon nanotube/peptide  
Tran Ngoc Huan, Thothadri Ganesh, Sung-Hwan Han, Moon-Young Yoon, Hoeil Chung  
**Biosensors and Bioelectronics 26 (2011) 4227–4230**

## 2009

- Square wave voltammetric detection of Anthrax utilizing a peptide for selective recognition of a protein biomarker  
Tran Ngoc Huan, Vu. T.T. Ha, Le Quoc Hung, Moon.Y. Yoon, Sung-Hwan Han, Hoeil Chung  
**Biosensors and Bioelectronics 25 (2009) 469–474**