

Ha Nguyen (Lac Ha)

Postdoctoral Researcher

Prof. Omar Yaghi research group, University of California, Berkeley

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EDUCATION:

Ph. D. in Chemistry 2017

University of Technology, Vietnam National University - Ho Chi Minh, Viet Nam

Advisor: Professor Nam T. S. Phan

B. Eng. Chemical Engineering 2011

Can Tho University, Can Tho City, Viet Nam

RESEARCH AND INTERNATIONAL TRAINING COURSES:

Postdoctoral Scholar 09/2018 – Present

University of California, Berkeley, CA, USA

Correspondence: Prof. Omar M. Yaghi

Focus: Focusing on projects involving the chemistry of MOF's, COF's, ZIF's, and related systems in the realm of reticular chemistry which are:

- Investigation on new topological structure of COFs for CO₂ uptake
- Isoreticular topological network in 2D COFs for water uptake application

Research consultant 10/2017 – 08/2018

Center for Research Excellence in Nanotechnology (CENT)

King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia

Correspondence: Prof. Omar M. Yaghi, Prof. Zain H. Yamani

Focus:

- Developing and implementing research plans for CO₂ reduction, adsorption, and separation
- Mentors Ph. D. Students on MOFs synthesis and characterization
- Performing research experiments and analyzing measurement data
- Performing, preparing, and writing scientific publications for high impact journals.

Researcher 01/2016 – 09/2017

Center for Inovative Materials and Architectures (INOMAR)

Vietnam National University–Ho Chi Minh City (VNU–HCM)

Advisors: Prof. Nam T. S. Phan

Focus: Design new approaches to synthesize novel porous materials (MOFs/ZIFs/COFs/MOP) for photoactivity enhancement; Synthesize new Fe-MOFs for high pressure methane storage; MTV linkage-based MOFs for gas storage; Understand the role of metal clusters in methane uptake in

order to enhance methane uptake capacity at high pressure; New concepts in drug delivery for cancer treatment.

Ph.D. Graduate Researcher

12/2012 – 12/2015

Center for Molecular and NanoArchitecture (MANAR)
Vietnam National University - Ho Chi Minh City (VNU–HCM)
Advisors: Dr. Hiroyasu Furukawa and Mr. Kyle E. Cordova

Focus: Develop strategies to synthesize topologically new ZIFs for relevant gas separations; Design new strategies for the synthesis of novel MOFs based on titanium-oxo clusters for photocatalytic applications; Synthesize new Fe-MOFs for methane high pressure methane storage; Understand the role of metal clusters on methane uptake in order to enhance the methane uptake capacity at high pressure; Develop the new MOFs for photocatalytic properties enhancement; Tunable bandgap of Zr-MOFs for CO₂ reduction studies.

Visiting Scholar, University of California, Berkeley

01/2014 – 07/2014

Prof. Omar M. Yaghi Research Laboratory
University of California, Berkeley, California
Advisor: Prof. Omar M. Yaghi

Duties: Synthesize MOFs based on hexameric titanium(IV) clusters via new strategy that combines MOF and COF chemistry for photocatalysis applications. In this project, the titanium clusters were formed *in situ* by the solvothermal synthesis and combined together via imine condensation reaction.

Ph.D. Student

09/2011 – 12/2012

Faculty of Chemical Engineering, University of Technology, VNU–HCM
Advisor: Prof. Nam T. S. Phan

Duties: Synthesize new heteroatomic linkers for MOF construction in the direction of catalytic application. Tritopic flexible linker contain amine functionalities were synthesized and full characterization. The MOFs synthesis investigation was studied with the various of metal source and this flexible linker. Only the nonporous MOFs material had been constructed.

SYNERGISTIC ACTIVITIES:

Referee for journals: Chemical Communications, Journal of Hazardous Materials, Polyhedron, Crystal Growth and Design, Current Organic Chemistry.

RESEARCH PUBLICATIONS:

20) **H. L. Nguyen**, C. Gropp, O. M. Yaghi “Reticulating 1D Ribbons into 2D Covalent Organic Frameworks by Imine and Imide Linkages” *J. Am. Chem. Soc.* **2020**, *142*, 2771.

19) **H. L. Nguyen**, N. Hanikel, S. J. Lyle, C. Zhu, D. M. Proserpio, O. M. Yaghi “A Porous Covalent Organic Framework with Voided Square Grid Topology for Atmospheric Water Harvesting” *J. Am. Chem. Soc.* **2020**, *142*, 2218.

- 18) H. M. Tran, L. T. T. Nguyen, T. H. Nguyen, **H. L. Nguyen**, N. T. S. Phan, G. Zhang, T. Yokozawa, H. Le Tran, P. T. Mai, H. T. Nguyen “Efficient synthesis of a rod-coil conjugated graft copolymer by combination of thiol-maleimide chemistry and MOF-catalyzed photopolymerization” *Eur. Polym. J.* **2019**, *116*, 190.
- 17) A. Helal, **H. L. Nguyen**, A. Al-Ahmed, K. E. Cordova, Z. H. Yamani “An ultrasensitive and selective metal organic framework chemosensor for palladium detection in water” *Inorg. Chem.* **2019** *58*, 1738.
- 16) H. C. Dong, **H. L. Nguyen**, H. M. Le, N. Thoai, Y. Kawazoe, D. Nguyen-Manh “Monitoring mechanical, electronic, and catalytic trends in a titanium metal organic framework under the influence of guest-molecule encapsulation using density functional theory” *Sci. Rep.* **2018**, *8*, 16651.
- 15) **H. L. Nguyen**, T. T. Vu, D.-K. Nguyen, C. A. Trickett, T. L. H. Doan, C. S. Diercks, V. Q. Nguyen, K. E. Cordova “A complex metal-organic framework catalyst for microwave-assisted radical polymerization” *Nature Commun. Chem.* **2018**, *1*, 70 (**corresponding author**).
- 14) H. T. Hoang, **H. L. Nguyen**, T. B. Phan, S. Bureekaew, Y. Kawazoe, H. Minh Le “From reticular chemistry design to density functional theory modeling for new zeolitic imidazolate framework topologies: Mechanical stability, electronic structure, and CO₂ selectivity” *J. Phys. Chem. C* **2018**, *122*, 23543. (**co-corresponding author**).
- 13) A. A. Alzahrani, Z. H. Yamani, **H. L. Nguyen** “Electrocatalytic CO₂ reduction: From homogeneous catalysts to heterogeneous-based reticular chemistry” *Molecules* **2018**, *23*, 2835 (**invited contribution in special issue, corresponding author**).
- 12) T. T. M. Nguyen, H. M. Le, Y. Kawazoe, **H. L. Nguyen** “Reticular control of interpenetration in a complex metal-organic framework” *Mater. Chem. Front.* **2018**, *2*, 2063. (**corresponding author**).
- 11) T. T. Pham, L. N. Le, H. N. Nguyen, T. T. K. Luong, T. N. Pham, **H. L. Nguyen**, T. K. Nguyen “Encapsulating gold nanoparticles in zeolitic imidazolate framework crystal for novel optical response” *Polyhedron* **2018**, *148*, 171 (**invited contribution in special issue**).
- 10) T. N. Tu, M. V. Nguyen, **H. L. Nguyen**, B. Yulianto, K. E. Cordova, S. Demir “Designing bipyridine-functionalized zirconium metal-organic frameworks as a platform for clean energy and other emerging applications” *Coord. Chem. Rev.* **2018**, *364*, 33.
- 9) **H. L. Nguyen** “The chemistry of titanium-based metal-organic frameworks” *New J. Chem.* **2017**, *41*, 14030 (**corresponding author**).
- 8) L. H. T. Nguyen, T. T. Nguyen, **H. L. Nguyen**, T. L. H. Doan, P. H. Tran “A new superacid hafnium-based metal-organic framework as a highly active heterogeneous catalyst for the synthesis of benzoxazoles under solvent-free condition” *Catal. Sci. Technol.* **2017**, *7*, 4346
- 7) T. V. Tran, H. T. N. Le, H. Q. Ha, X. N. T. Duong, L. H.-T. Nguyen, T. L. H. Doan, **H. L. Nguyen**, Thanh Truong “A five coordination Cu(II) cluster-based MOF and its application in the synthesis of pharmaceuticals via sp³ C–H/N–H oxidative coupling” *Catal. Sci. Technol.* **2017**, *7*, 3453 (**co-corresponding author**).

6) **H. L. Nguyen**, T. T. Vu, D. Le, T. L. H. Doan, V. Q. Nguyen, N. T. S. Phan “A Titanium–Organic Framework: Engineering the Band Gap Energy for Photocatalytic Property Enhancement” *ACS Catal.* **2017**, *7*, 338 (co-corresponding author).

5) B. T. Nguyen, **H. L. Nguyen**, T. C. Nguyen, K. E. Cordova, H. Furukawa “High Methanol Uptake Capacity in Two New Series of Metal–Organic Frameworks: Promising Materials for Heat Transformation Applications” *Chem. Mater.* **2016**, *28*, 6243.

4) **H. L. Nguyen**, F. Gándara, H. Furukawa, T. L. H. Doan, K. E. Cordova, O. M. Yaghi “A Titanium–Organic Framework as an Exemplar of Combining the Chemistry of Metal- and Covalent–Organic Frameworks” *J. Am. Chem. Soc.* **2016**, *138*, 4330.

3) T. N. Tu, N. Q. Phan, T. T. Vu, **H. L. Nguyen**, K. E. Cordova, H. Furukawa “High Proton Conductivity at Low Relative Humidity in an Anionic Fe-based Metal–Organic Framework” *J. Mater. Chem. A* **2016**, *4*, 3638.

2) L. T. M. Hoang, L. H. Ngo, **H. L. Nguyen**, H. T. H. Nguyen, C. K. Nguyen, B. T. Nguyen, Q. T. Ton, H. K. D. Nguyen, K. E. Cordova, T. Truong “Azobenzene-Containing Metal–Organic Framework as an Efficient Heterogeneous Catalyst for Direct Amidation of Benzoic Acids: Synthesis of Bioactive Compounds” *Chem. Commun.* **2015**, *51*, 17132.

1) T. L. H. Doan, **H. L. Nguyen**, H. Q. Pham, N.-N. Pham-Tran, T. N. Le, K. E. Cordova “Tailoring the Optical Absorption of Water-Stable Zr(IV) and Hf(IV) Based Metal–Organic Framework Photocatalysts” *Chem. Asian J.* **2015**, *10*, 2660.

ORAL PRESENTATIONS:

7) **H. L. Nguyen**, the seminar at Chemistry Department, King Fahd University of Petroleum & Minerals (KFUPM), “The Chemistry of Titanium-based Metal–Organic Frameworks”, Dharan, Saudi Arabia, 2017.

6) **H. L. Nguyen**, “Pow-wow” presentation at Center for Research Excellence in Nanotechnology (CENT): “Titanium-based Metal–Organic Frameworks: From Design to Engineering the Structure for Photocatalytic Applications”, Dharan, Saudi Arabia, 2017

5) **H. L. Nguyen**, “MOFs for CO₂ and CH₄ Gas Capture Application” Workshop on Metal–Organic Frameworks: Definitions, Synthesis, Characterization and Applications, Bandung, Indonesia, 2017.

4) **H. L. Nguyen**, “A Ph.D. Student’s Perspective on Global Science” The Making of Metal–Organic Frameworks (TMO-MOF), Serdang, Malaysia, 2017.

3) **H. L. Nguyen**, T. T. Vu, D. Le, T. L. H. Doan, V. Q. Nguyen, N. T. S. Phan “Designed synthesis of Titanium–Organic Frameworks for Photocatalytic Application” *the Third International Workshop on Nano Materials for Energy Conversion (NMEC-3)*, Ho Chi Minh, Viet Nam, 2017.

2) **H. L. Nguyen**, F. Gándara, H. Furukawa, T. L. H. Doan, K. E. Cordova, O. M. Yaghi “A Titanium–Organic Framework as an Exemplar of Combining the Chemistry of Metal- and Covalent–Organic

Frameworks” Presented at the 8th International Workshop on Advanced Materials Science and Nanotechnology (IWAMSN2016), Ha Long, Viet Nam, 2016.

1) **H. L. Nguyen** and K. E. Cordova, *Crystalline Zeolitic Imidazolate Frameworks as Selective Adsorbents for the Capture of Carbon Dioxide Under Humid Conditions*. Presented at the 7th International Workshop on Advanced Materials Science and Nanotechnology (IWAMSN2014), Hanoi, Viet Nam, 2014.

POSTER PRESENTATIONS:

2) Bao N. Truong, Linh H. T. Nguyen, **H. L. Nguyen**, “Designed-Synthesis and full Characterization of Thio-based Organic Linker for the Synthesis of Electron Conductivity MOFs”, *the 1st International Conference on Applied Sciences (ICAS-1)*, **July 2016**, Ho Chi Minh, Viet Nam.

1) **H. L. Nguyen**, H. Furukawa, F. Gándara, H. T. Nguyen, K. E. Cordova, O. M. Yaghi, “A Two-Dimensional Zeolitic Imidazolate Frameworks-based on Square Planar and Tetrahedral Building Block Mixing”, *150 Years of Beautiful Structures and Defects*, **November 2015**, Ho Chi Minh, Viet Nam.

RESEARCH PROJECT GRANTS

- 4) **H. L. Nguyen**, “Metal-Organic Frameworks based Open Iron (III) sites for methane storage enhancement at high pressure”, *Principal Investigator*, **VNU-B Key Grant**, *VNUB-2017-50-01* (40,000 USD of funding).
- 3) **H. L. Nguyen**, “Functionalizing of Titanium–Organic Frameworks for photocatalytic property enhancement”, *Principal Investigator*, **Fundamental Grant** *INOMAR-CS2016-02* (10,000 USD of funding)
- 2) **H. L. Nguyen**, “A new hybrid Titanium Metal Covalent Organic Frameworks containing photochemistry property”, *Principal Investigator*, **Fundamental Grant** *MANAR-CS-2015-04* (5,000 USD of funding)
- 1) **H. L. Nguyen**, “Synthesis and characterization of new topology ZIFs”, *Principal Investigator*, **Fundamental Grant** *MANAR-CS-2013-01* (3,500 USD of funding)

SCHOLARSHIP AND AWARD:

- 6) Certificate of Achievement Awarded by The Hochiminh City Fund for Exemplary Young Citizen 2017.
- 5) Exemplary Young Citizen of Vietnam 2016.

Certificate of Achievement Awarded by First Secretary of the Hochiminh Communist Youth Union of Vietnam.

- 4) Excellent Research Publication of Vietnam National University–HCM 2016
- 3) Ten of nominated candidates for award of “Exemplary Young Citizen of HCM City 2016”

Certificate of Achievement Awarded by President of People Committee of HCM City.

- 2) Full scholarship of “Toshiba Scholarship 2016”, awarded to the young researcher having competitive researches and publications.

Certificate of Achievement Awarded by Toshiba Corporation and VNU–HCM

- 1) Winner of “Odon Vallet Scholarship 2016”, awarded to the young researcher having competitive researches and publications.

EXTRACURRICULAR ACTIVITIES

Participating Scholar, INOMAR training course	11/2016
"Critical Skills to Excel in the Demanding Globalization"	
Center for Innovative Materials and Architectures (INOMAR), Ho Chi Minh, Vietnam	
Lecturer: Mr. Giang T. Dao	
<i>Certificate of Achievement Awarded</i>	

Duties: Training course on “Critical Skills”, in which many concepts to excel in the Demanding Globalization such as Innovation, Critical Thinking, IP, Blue Ocean-Red Ocean, etc. were introduced and discussed.

Participating Scholar, TOPOS International Scientific School **09/2015**

"Combined Topological and DFT Methods for Prediction of New Materials"

Samara State University, Samara Oblast, Russia

Lecturer: Profs. Vladislav A. Blatov, Davide M. Proserpio, Vladimir A. Saleev

Duties: Training course on "Topological Crystal Chemistry", in which topological methods and tools were used together with common DFT methods for creating complex systems (crystalline, extended structures) in materials science.

Participating Scholar, International Scientific Course **06/2012; 07/2013**

"Introduction to Topological Analysis, Nets and Tiling in MOF and ZIF Materials"

Center for Molecular and NanoArchitecture, VNU–HCM

Lecturer: Prof. Michael O’Keeffe

Certificate of Achievement Awarded

Duties: Fundamental concepts in crystallography and topology were taught. CrystalMaker software was used to analyze the topology of a given material. General concepts and analysis of the nets and tilings found in a topologically-relevant structure.

Participating Scholar, International Scientific Course **12/2013; 12/2015**

"Gas Adsorption in MOFs and ZIFs"

Center for Molecular and NanoArchitecture, VNU–HCM

Lecturer: Dr. Hiroyasu Furukawa

Duties: Fundamental concepts on how to analyze the gas adsorption properties of crystalline porous materials, such as MOFs and ZIFs. Other crucial factors and parameters for solving common adsorption problems were also introduced.