Ha Lac Nguyen

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Center for Innovative Materials and Architectures (INOMAR), VNU–HCM
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EDUCATION:

Ph.D. Candidate, Chemistry **Expected Graduation: 2016-2017**
University of Technology, Vietnam National University - Ho Chi Minh, Viet Nam
Advisor: Professor Nam T. S. Phan

Bachelor of Engineering, Chemical Engineering
Can Tho University, Can Tho City, Viet Nam

RESEARCH AND INTERNATIONAL TRAINING COURSES:

Ph.D. Graduate Researcher **01/2016 – Present**
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 the novel porous materials (MOFs/ZIFs/COFs/MOP) for photoactivity features enhancement; Synthesize new Fe-MOFs for high pressure methane storage; MTV linkage-based MOFs for gas storage; Understand the role of metal clusters on methane uptake in order to enhance the 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: Prof. Nam T. S. Phan, 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 CO_2 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 hexameric titanium(IV) clusters via new strategy that combines MOF and COF chemistry for photocatalysis applications. In this project, the titanium clusters were *in situ* formed 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.

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
Certificate of Achievement Awarded

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
Certificate of Achievement Awarded

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.

RESEARCH PUBLICATIONS:

*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.

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:

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

3) **H. L. Nguyen**, *Progress of porous material research in MANAR Center*. Presented at Center for molecular and NanoArchitecture (MANAR) for Prof. Seiji Iwasa (Toyohashi University of Technology) Visiting, Ho Chi Minh, Viet Nam, April 2016.

2) **H. L. Nguyen**, *Tunability of the photocatalytic properties for the polymerization reaction based Titanium-Organic Frameworks*. Presented at Center for molecular and NanoArchitecture (MANAR) for Visitors of Office of Naval Research Global, Ho Chi Minh, Viet Nam, Mar 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

3) **H. L. Nguyen**, "Metal-Organic Frameworks based Open Iron (III) sites for methane storage enhancement at high pressure", *Principal Investigator*, **VNU-B Key Grant,** *Accepted* (funding pending).

2) **H. L. Nguyen**, "A new hybrid Titanium Metal Covalent Organic Frameworks containing photochemistry property", *Principal Investigator*, **Fundamental Grant** *MANAR-CS-2015-04* (5000 USD of funding)

1) **H. L. Nguyen**, "Synthesis and characterization of new topology ZIFs", *Principal Investigator*, **Fundamental Grant** *MANAR-CS-2013-01* (3500 USD of funding)

SCHOLARSHIP AND AWARD:

4) Winner of "Excellent Research Publication of Vietnam National University–HCM 2016" (Special Prize)

Certificate of Achievement Awarded by Director of VNU–HCM (Prof. Dat T. Huynh).

3) Ten of nominated candidates for award of "Exemplary Young Citizen of HCM City 2016"

Certificate of Achievement Awarded by Youth Union 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.

INSTRUMENTATION EXPERTISE:

These following instruments for porous material characterization are professionally operated:

- X-ray diffraction (XRD) instrument including powder and single crystal XRD analysis
- Fourier transform infrared spectroscopy (FT-IT)
- Thermogravimetric analysis (TGA)
- Inert gas Glove Box
- Air Free Schlenk line system
- Gas Adsorption measurement
- Photocatalytic spectrophotometer
- Vacuum sealing off glass tube by Torch

SOFTWARE EXPERTISE:

These following softwares for crystal structure modelling and refinement are professionally operated:

- Material Studio for crystal structure modeling and calculation
- Crystal Maker for crystal structure visualization
- VESTA for crystal structure visualization
- APEX II for single crystal measurement operation
- ShelXle 2014 for single crystal structure XRD refinement

- PLANTON for single crystal analyses.
- EXPO 2013 for power XRD solution
- FOX for power XRD solution
- Superflip for power XRD solution
- TOPOS for topological analysis