筑波大学
University of Tsukuba

Internship report

جامعة محمد الأول بوجدة
UNIVERSITE MOHAMMED PREMIER OUJDA

Training of Abderrahim TITI in Coordination chemistry laboratory

Graduate School of Pure and Applied Sciences, University of Tsukuba

November 2018 in OSHIO Lab, Tsukuba City, Japan

Supervised by: *Professor Rachid TOUZANI*

Professor Hiroki OSHIO

Professor Takuya SHIGHA

ACKNOWLEDGMENTS

First, I am thankful and grateful to Almighty Allah for the good health, compassionate, wellbeing and helping that were necessary to complete this internship at **OSHIO Lab** at **Tsukuba University**, Tsukuba City a lovely city.

I would like to express my deepest gratitude **to Prof. Hiroki OSHIO**, for his excellent guidance, encouraging and for providing me with an excellent atmosphere for doing research.

I place on record, my sincere thanks to my supervisor **Prof. Rachid Touzani**, for assisting in numerous ways, valuable pieces of advice and help.

Special Thanks to Prof **Takuya SHIGHA** for quality for their encouragement, support, and guidance, which helped us in successfully completing this internship.

My sincere thanks go also to **Prof Smaail Radi**, dean of faculty of science at Mohamed First University (Oujda Morocco) and **Prof Hammouti** for valuable advice and help.

My sincere thanks also goes to **Prof OUSSAID** Adyl for his help.

I am extremely grateful to all the worthy staff members of OSHIO Lab, for their helpful attitude and constant support, especially, **Doc. WEI Rong Jia,** JSPS Foreign Researcher, **Masayuki NIHEI**.

I would like to extend our sincere esteems to all staff in a laboratory for their timely support during my internship, **Prof. Rie MIURA, Secretary, and all PhD and Master Students.**

OSHIO Lab

The **Oshio lab** is a complex systems and coordination chemistry group based at the University of Tsukuba, Japan. The group is involved in a wide range of areas, which can be broadly grouped as ‘Responsive Molecular Systems’, ‘Coordination Architectures’ and ‘Functional Molecular Oxides’. A bistable system can rest in two stable phases, at free energy minima, and switching between the phases can be achieved by the application of external stimuli such as temperature/light/pressure/host-guest interactions... Bistable molecules have, therefore, attracted intense research interest due to their potential applications in molecular switches and memory devices, for which spin-crossover (SCO) and electron transfer–active chromophores are promising building blocks. Multi-component materials, in which each component exhibits different bistability, can be expected to show synergistic properties, such as stepped phase transition and selective excitation to meta-stable states and may function as multibistable molecular switching systems.

Group

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Hiroki Oshio graduated from Kyushu University in 1977 and obtained his Ph.D. in 1982. After a postdoctoral fellowship at Marquette University between 1982 and 1984, he was appointed as a research associate at the Institute for Molecular Science (Okazaki, Japan) in 1985. In 1992 he moved to Tohoku University as an Associate Professor, before he was appointed as a Professor at the University of Tsukuba in the Graduate School of Pure and Applied Sciences in 2001. His research has focused on molecular magnetism, including bistable and spin-crossover systems. He received the CSJ Award for Creative Work (2005) and has accumulated over 200 peer-reviewed research publications.

❖ ***Rsearch Fieds***

Coordination Chemistry

Inorganic Chemistry

❖ ***Academic Society***

Chemical Society of Coordination Chemistry

❖ ***Award***

2016/06 Japan Society of Coordination Chemistry Award for 2016 2006/03 the Chemical Society of Japan Award for Creative Work for 2005

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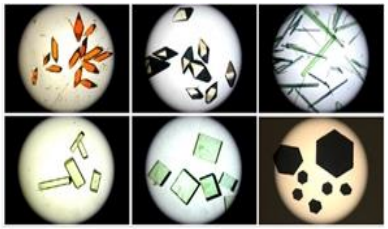
Lab Information

Transition Metal Complexes...

The assembly of designable organic ligands and transition metal ions with variable electronic states



Research Areas

- Responsive Molecular Systems
- Coordination Architectures
- Functional Molecular Oxides

Experimental Facilities

- X-ray Bruker APEX I
- X-ray Bruker APEX II
- SQUID Magnetometor MPMS 5XL
- iHe3 Low temperature unit
- Physical Property Measurement System PPMS
- Mossbauer Spectrometer
- UV-Vis-NIR Spectrometer Shimadzu
- FT-IR Spectrometer Shimadzu
- Electrochemical Property Measurement System BAS
- Thermogravimetry measurement System Perkin－Elmer TG
- Glovebox
- Multiple Fume cupboards
- Experimental room

Training :

- **Synthesis of a series of polynuclear materials (clusters mono and bimetallic)**
- **Measurements of infrared spectra**
- **Measurements of single crystal of X-ray diffraction**

Some Papers

Synthesis of novel Cl2Co4L6 cluster using 1-hydroxymethyl-3,5-dimethylpyrazole (LH) ligand: Crystal structure, spectral, thermal, Hirschfeld surface analysis and catalytic oxidation evaluation

Abderrahim Titia, Takuya Shigab, Hiroki Oshiob,*, Rachid Touzania, Belkheir Hammoutic, Messali Mouslimd, Ismail Warade,f

https://doi.org/10.1016/j.molstruc.2019.126995

Synthesis, characterization, X-Ray crystal study and bioctivities of pyrazole derivatives: Identification of antitumor, antifungal and antibacterial pharmacophore sites

AbderrahimTiti[a],MouslimMessali[b],BakhetA.Alqurashy[c],RachidTouzani[a],TakuyaShiga[d], Hirok iOshio[d],MohammedFettouhi[e],MehdiRajabi[f],Faisal, A.Almalki[g],TaibiBen Hadda[a,g]

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gDepartment of Pharmaceutical Chemistry, Faculty of Pharmacy, Umm Al-Qura University, Makkah Almukkarramah, Saudi Arabia

https://doi.org/10.1016/j.molstruc.2019.127625

Synthesis and XRD of novel $Ni_4(\mu_3\text{-}O)_4$ twist cubane cluster using three NNO mixed ligands: Hirshfeld, spectral, thermal and oxidation properties

Abderrahim Titi[a*], Hiroki Oshio[b], Rachid Touzani[a], Messali Mouslim[c], Abdelkader Zarrouk[d], Belkheir Hammouti,[a] Nabil Al-Zaqri[e], Ali Alsalme[e], Ismail Warad[f,h*]

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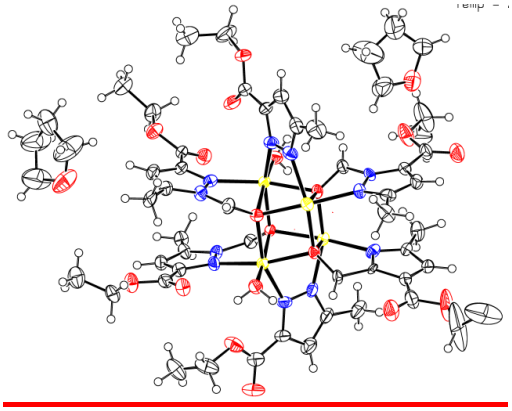
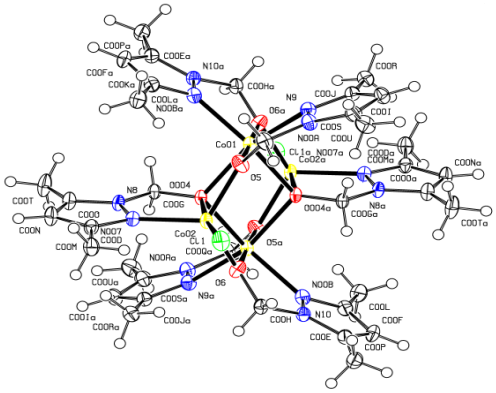
[h]Department of Chemistry, Science College, An Najah National University, P.O. Box 7, Nablus, Palestine

under soumission

Some nice of Clusters Structures of Single X-Ray Analysis.





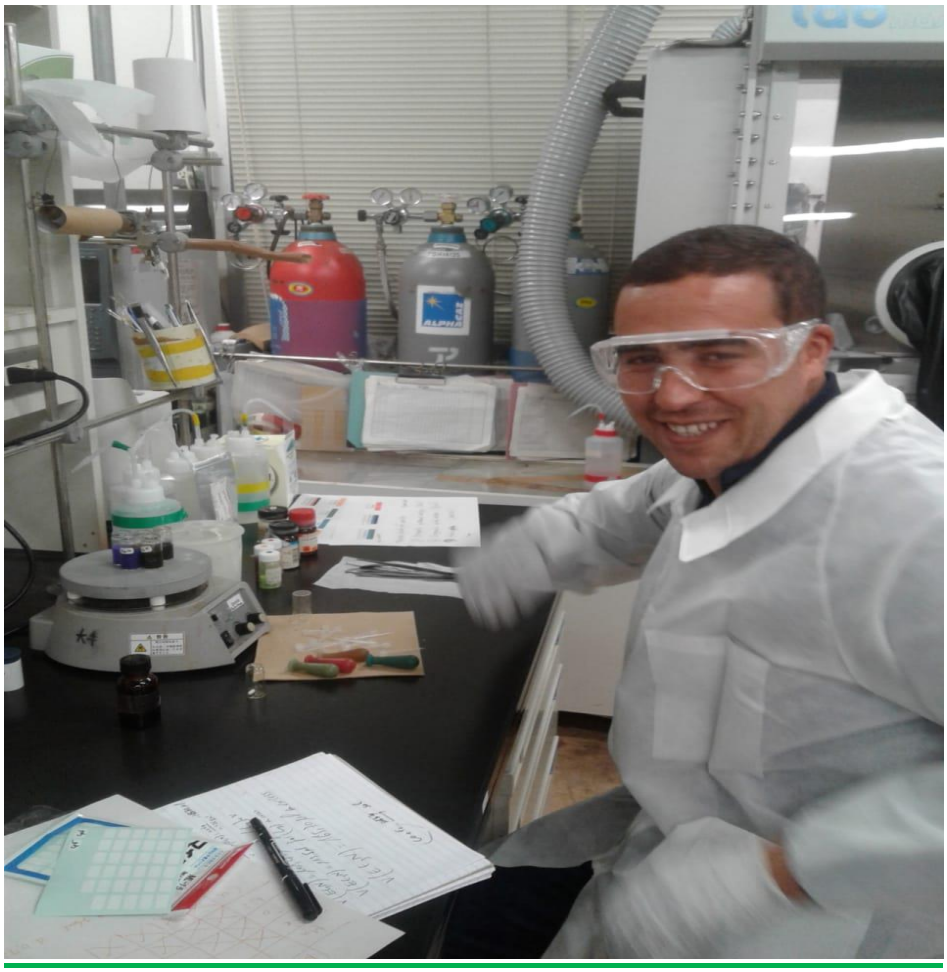
Some nice pictures at Tsukuba University

University of Tsukuba – Entrance

Oshio Lab is inside this building

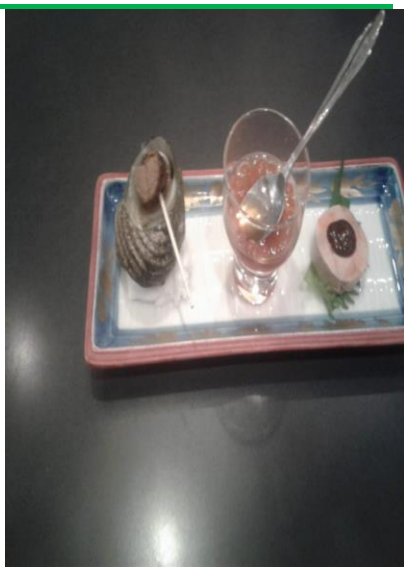
University of Sciences

Picture at the Center of Tsukuba University



Working inside Oshio lab

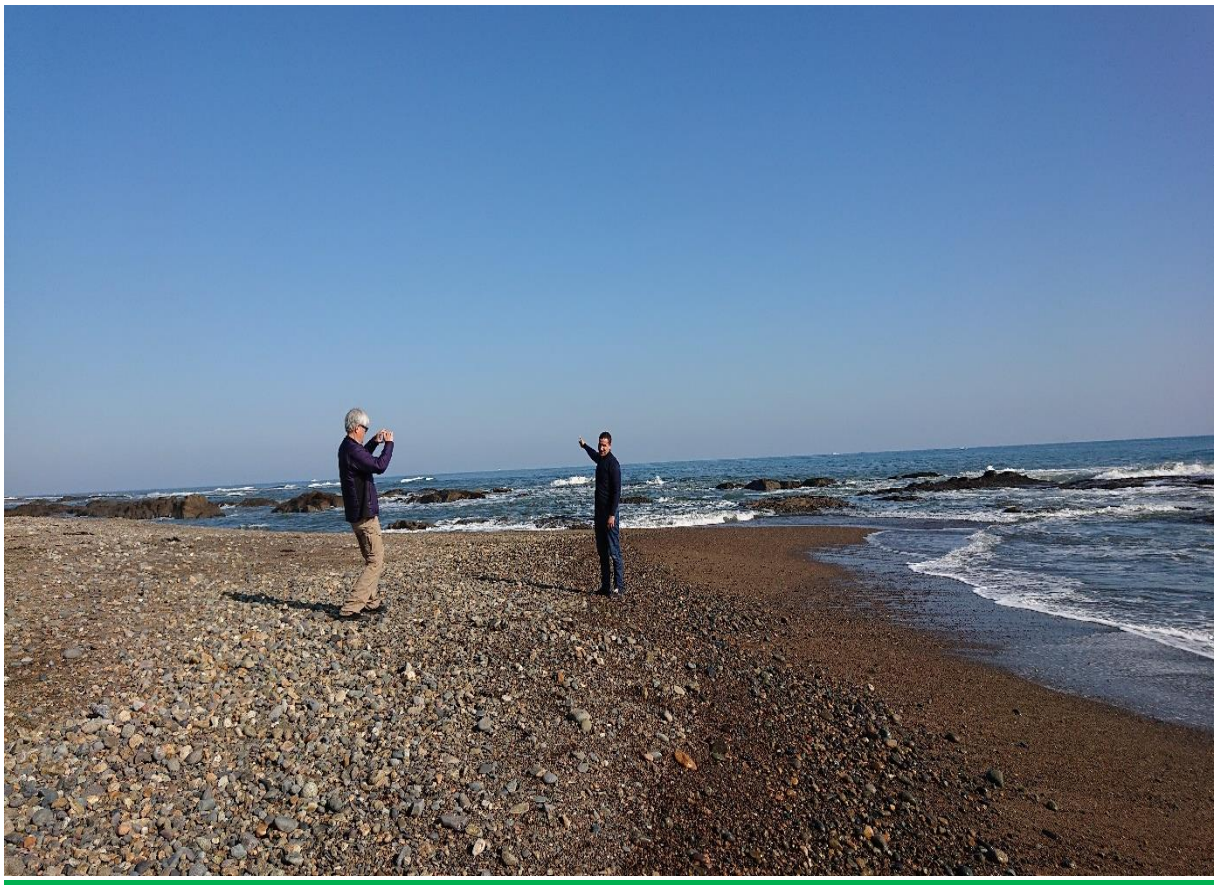
An invite to a Sushi meal from Mr. Oshio Hiroki



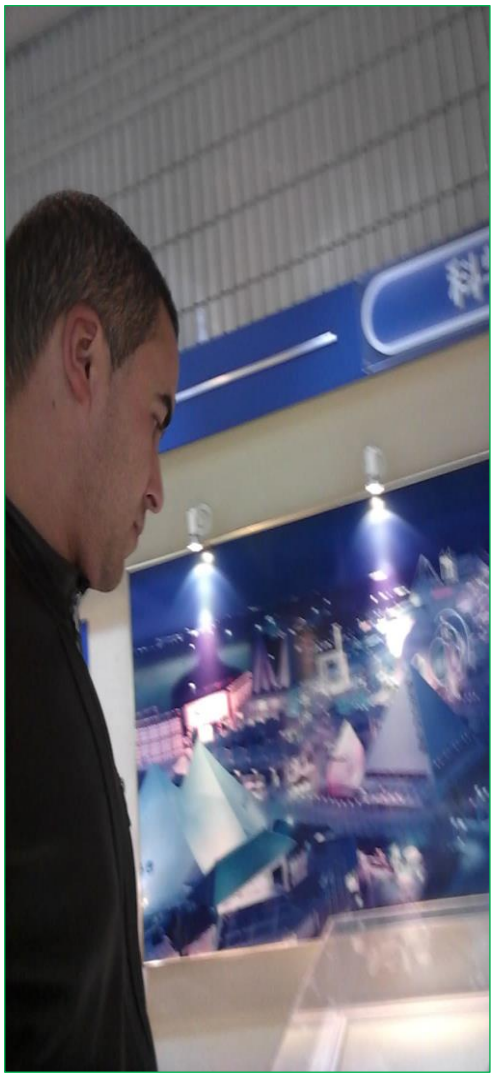
Memorable moments at Fish market and Sushi bar Ōarai, Ibaraki with Group Oshio Lab

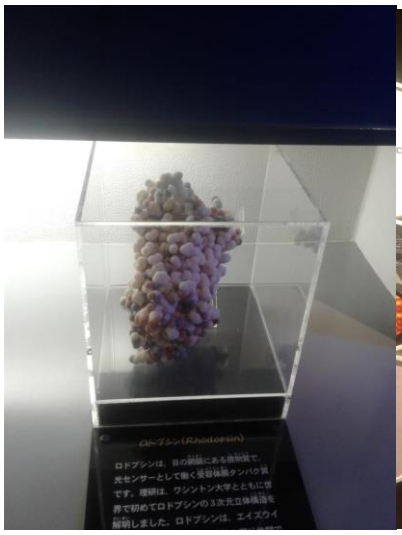

まるごと解汁
海鮮焼


冷酒 700円
日本酒 一合 350円
缶チューハイ (レモン) 300円
生ビール 中 500円
生ビール 小 300円
缶ビール (アサヒ) 300円
アサヒ ドライゼロ 350円
うなぎ ¥400



Pictures Taken During my Visit to Tsukuba Space Center





Finally, I share with you some Pictures of this Beautiful City.

During my stay at the laboratory of Oshio in the Japanese University of Tsukuba, I have benefited greatly from their expertise in the field of Chemistry; specifically, in Organometallic chemistry. Moreover, I have had the pleasure to receive a personal training in Apex II, the machine that measures single crystal of X-ray diffraction. My findings allowed me to produce more than three scientific papers. Furthermore, I have got to experience and discover the Japanese culture, its values, its kitchen and its heritage.