

Personal Data:

Name: CHENG-HAN YANG
 Date of Birth: May 5, 1979
 Place of Birth: Pingtung, Taiwan (R.O.C.)
 Address: AG Prof. De Cola - Physikalisches Institut
 Westfälische Wilhelms-Universität Münster
 Mendelstrasse 7, D-48149 Münster, Germany
 Telefon: +49 (0)251 980 2827
 E-mail : chyang0505@gmail.com or cyang_01@uni-muenster.de
 Webpage: <http://www.uni-muenster.de/Physik.PI/DeCola/chenghanyang.html>

**EDUCATION:**

2003 - 2007 **Ph.D. in Chemistry**, Department of Science, National Tsing Hua University, Taiwan, R.O.C (Supervisor: Prof. Yun Chi)
Synthesis and Photophysical Properties of High Efficiency Phosphorescent Iridium(III) Complexes and Their Application in OLEDs

2001 -2003 **Master in Chemistry**, Department of Science, Soochow University, Taiwan, R.O.C (Supervisor: Prof. Chih-Chieh Wang)
Synthesis, Crystal structure and Properties of Mixed-Ligands Metal Coordination Complexes

1997- 2001 **Bachelor in Chemistry**, Department of Science, Soochow University, Taiwan, R.O.C

WORK EXPERIENCE :

08.2010 - **Post-doctorate researcher** (AG Prof. De Cola)

02.2009- 07.2010 **Humboldt Fellow** (AG Prof. De Cola - Physikalisches Institut Westfälische Wilhelms-Universität Münster, Center for Nanotechnology (CeNTech))
 (Supervisor: Prof. Luisa De Cola)
 Project: *Light-Emitting Electrochemical Cells Using Cationic Phosphorescent Metal Complexes: Strategic Design, Fundamental Photophysics And Applications*”.

07.2008- 01.2009 **Post-doctorate researcher** (AG Prof. De Cola - Physikalisches Institut Westfälische Wilhelms-Universität Münster)

08.2007- 04.2008 **Post-doctorate researcher** (Department of Chemistry, National Taiwan University, Taipei, Taiwan) (Supervisor: Prof. Pi -Tai Chou)

07.2004 -12.2004 **Visiting Scientist** (National Research Council, Ottawa, Canada.)
 (Supervisor: Prof. Arthur J. Carty)

PUBLICATIONS :

1. **C.-H. Yang**, J. Beltran, V. Lemaury, J. Cornil, D. Hartmann, W. Sarfert, R. Fröhlich, C. Bazzarri, L. De Cola*, “Iridium Metal Complexes Containing Carbene Ligands for Blue Light-Emitting Electrochemical Cells”. **2010**, *Inorg. Chem.* in press.
2. M. Müller, A. Devaux, **C.-H. Yang**, L. De Cola*, R. A. Fischer*, “Highly emissive metal–organic framework composites by host–guest chemistry”. *Photochem. Photobiol. Sci.*, **2010**, **9**, 846-853.
3. K. Chen, **C.-H. Yang**, Y. Chi,* C.-S. Liu, C.-H. Chang, C.-C. Chen, C.-C. Wu,* M.-W. Chung, Y.-M. Cheng, G.-H. Lee, P.-T. Chou* “Homoleptic Tris(Pyridyl Pyrazolate) Ir(III) Complexes: En Route to Highly Efficient Phosphorescent OLEDs”. *Chem. Eur. J.* **2010**, **16**, 4315.

4. C.-H. Chang, C.-C. Chen, C.-C. Wu*, **C.-H. Yang**, Y. Chi* "Efficient iridium(III) based, true-blue emitting phosphorescent OLEDs employing both double emission and double buffer layers". *Organic Electronics*. **2009**, *10*, 1364.
5. Y.-M. Cheng, G.-H. Lee, P.-T. Chou*, L.-S. Chen, Y. Chi,* **C.-H. Yang**, Y.-H. Song, S.-Y. Chang, P.-I. Shih, C.-F. Shu* "Rational Design of Chelating Phosphine Functionalized Os(II) Emitters and Fabrication of Orange Polymer Light-Emitting Diodes Using Solution Process". *Adv. Funct. Mater.* **2008**, *18*,183.
6. **C.-H. Yang**, Y.-M. Cheng, Y. Chi,* C.-J. Hsu, F.-C. Fang, K.-T. Wong, P.-T. Chou,* C.-H. Chang, M.-H. Tsai, C.-C. Wu* "Blue-Emitting Heteroleptic Iridium(III) Complexes Suited for High Efficiency Phosphorescent OLEDs". *Angew. Chem. Int. Ed.* **2007**, *46*, 2418.
7. C.-J. Chang, **C.-H. Yang**, K. Chen, Y. Chi,* C.-F. Shu, Y.-M. Cheng, P.-T. Chou,* G.-H. Lee "Color Tuning within the Heteroleptic Cyclometalated Ir(III) Complexes: Influence of the Ancillary Ligand". *Dalton. Trans.* **2007**, 1881.
8. P.-I. Shih, C.-H. Chien, C.-Y. Chuang, C.-F. Shu,* **C.-H. Yang**, J.-H. Chen, Y. Chi* "New Ultrahigh Energy Gaps Host Material for Highly Efficient Blue Phosphorescent OLEDs". *J. Mater. Chem.* **2007**, *17*, 1692.
9. Y.-S. Yeh, Y.-M. Cheng, P.-T. Chou,* G.-H. Lee, **C.-H. Yang**, Y. Chi,* C.-H. Wang "A New Family of Homoleptic Ir(III) Complexes; Tris-Pyridyl Azolate Derivatives with Dual Phosphorescence". *ChemPhysChem* **2006**, *7*, 2294.
10. C.-H. Feng, Y.-L. Chen, **C.-H. Yang**, Y. Chi,* Y.-S. Yeh, E. Y. Li, Y.-M. Cheng, P.-T. Chou,* C.-T. Chen "Iridium (I) Pyridyl Pyrazolate and Triazolate Complexes with Pure MLCT Phosphorescence as Red-Emitters for OLEDs". *Chem. Eur. J.* **2007**, *13*, 2686.
11. H.-Y. Chen, **C.-H. Yang**, Y. Chi, * Y.-M. Cheng, Y.-S. Yeh, P.-T. Chou,* H.-Y. Hsieh, C.-S. Liu, S.-M. Peng, G.-H. Lee "Room-temperature NIR phosphorescence of new iridium (III) complexes with ligands derived from benzoquinoxaline". *Can. J. Chem.* **2006**, *84*(2): 309.
12. C.-C. Wang,* **C.-H. Yang**, G.-H. Lee "Hydrothermal Synthesis and Structural Characterization of Two pH-Controlled Cd-Squarate Coordination Frameworks, $[\text{Cd}_2(\text{C}_4\text{O}_4)_{2.5}(\text{H}_2\text{O})_4] \cdot (\text{dpaH}) \cdot 1.5(\text{H}_2\text{O})$ and $[\text{Cd}(\text{C}_4\text{O}_4)(\text{dpa})(\text{OH}_2)]$ (dpa = 2,2'-dipyridyl- amine)". *Eur. J. Inorg. Chem.* **2006**, 820.
13. **C.-H. Yang**, S.-W. Li, Y. Chi,* Y.-M. Cheng, Y.-S. Yeh, P.-T. Chou,* S.-M. Peng, G.-H. Lee, C.-H. Wang, C.-F. Shu "Heteroleptic Cyclometalated Ir(III) Complexes Displaying Blue Phosphorescence in Solution and Solid State at Room Temperature". *Inorg. Chem.* **2005**, *44*, 7770.
14. C.-C. Wang,* **C.-H. Yang**, G.-H. Lee, H.-L. Tsai "Syntheses, Structures, and Magnetic Properties of Two 1D, Mixed-Ligand, Metal Coordination Polymers, $[\text{M}(\text{C}_4\text{O}_4)(\text{dpa})(\text{OH}_2)]$ (M = Co^{II} , Ni^{II} , and Zn^{II} ; dpa = 2,2'-dipyridylamine) and $[\text{Cu}(\text{C}_4\text{O}_4)(\text{dpa})(\text{H}_2\text{O})]_2 \cdot (\text{H}_2\text{O})$ ". *Eur. J. Inorg. Chem.* **2005**, 1334.
15. K.-T. Wong,* Y.-L. Liao, Y.-C. Peng, C.-C. Wang,* S.-Y. Lin, **C.-H. Yang**, S.-M. Tseng, G.-H. Lee, S.-M. Peng " A Novel Right-Angled Ligand that Forms Polymeric Metal-Organic Frameworks with Nanometer-Sized Square Cavities". *Crystal Growth & Design* **2005**, *5*, 2, 667.
16. C.-C. Wang,* **C.-H. Yang**, S.-M. Tseng, G.-H. Lee, H.-S. Sheu, K. W. Phyu "A New Moisture-Sensitive Metal-Coordination Solids, $\{[\text{Cd}(\text{C}_4\text{O}_4)(\text{bipy})(\text{H}_2\text{O})_2] \cdot 3\text{H}_2\text{O}\}_\infty$ (bipy = 4,4'-bipyridine)". *Inorg. Chim. Acta.* **2004**, *357*, 3759.
17. C.-C. Wang,* **C.-H. Yang**, S.-M. Tseng, S.-Y. Lin, T.-Y. Wu, M.-R. Fuh, G.-H. Lee, K.-T. Wong,* R.-T. Chen, Y.-M. Cheng, P.-T. Chou* "Structural Characterization and Luminescence Behavior of A Silver(I) 1D Polymeric Chain Constructed via the Bridge with Unusual 4,5-Diazospirobifluorene and Perchlorate". *Inorg. Chem.* **2004**, *43*, 4781.
18. C.-C. Wang,* H.-W. Lin, **C.-H. Yang**, C.-H. Liao, I.-T. Lan, G.-H. Lee "Synthesis and Structure of A

- Novel Two-dimensional Bi-layer Framework of $[M(C_5O_5)(dpe)]$ Coordination Polymer". *New. J. Chem.* **2004**, *28*, 180-182.
19. C.-C. Wang,* **C.-H. Yang**, S.-M. Tseng, G.-H. Lee, Y.-P. Chiang, H.-S. Sheu "Self-Assembly of A Mixed-ligands Metal-Coordination Polymeric Networks of Cd(II) Croconate ($C_5O_5^{2-}$) with 4,4'-bipyridine (4,4'-bpy)". *Inorg. Chem.* **2003**, *42*, 8294.
 20. **C.-H. Yang**, C.-M. Chuo, G.-H. Lee, C.-C. Wang* "Self-assembly of two mixed-ligands metal-organic coordination polymers, $[M^{II}(DPA)_2(C_2O_4)(C_4O_4)]$ (M = Cu, Zn)". *Inorg. Chem. Commu.* **2003**, *6*, 135.
 21. C.-C. Wang*, **C.-H. Yang**, G.-H. Lee "Synthesis and Structural Characterization of $[Na_2M(C_5O_5)_2(H_2O)_2] \cdot 4H_2O$ (M = Ni^{II}, Cu^{II})". *Inorg. Chem.* **2002**, *41*, 1015.
 22. C.-C. Wang*, **C.-H. Yang**, C.-H. Lee, G.-H. Lee "Hydrothermal Synthesis and Structural Characterization of a Two-Dimensional Polymeric Copper(II) Complex Containing an Unusual Bridged H_2edta^{2-} Ligand". *Inorg. Chem.* **2002**, *41*, 429.

PATENTS:

1. *A Kind Of Iridium Based Phosphorescent Material And Organic Electroluminescent Device Thereof* (Taiwan(R.O.C.) Patent application filed, **2006**)
2. *Blue-Emitting Iridium Complexes, Method of Fabricating The Same And Phosphorescent Organic Light Emitting Diode Thereof* (U. S. Patent application filed, **2007**)
3. *Neutral Chelating Carbene Containing Ligands For Iridium Based Emitters For Organic Light Emitting Electrochemical Cell Applications* (German Patent application filed, **2009**)

CONFERENCE PAPERS AND POSTERS:

1. International Chemical Conference-Materials Chemistry, Taipei, ICCT-2002 (2002, Hsinchu, Taiwan), **Poster**.
2. Chinese Chemistry Conference, Taiwan.(2001-2006), **Poster (Best Poster Award in Inorganic Chemistry Section, 2006)**
3. The 6th International Conference on Electroluminescence of Molecular Materials and Related Phenomena (ICEL-6), Hong Kong, **Poster**.
4. IDMC 2007 (International Display Manufacturing Conference & Exhibition 2007), Taipei, Taiwan, **Oral Presentations**.
5. 18th ISPPCC (18th International Symposium on the Photochemistry and Photophysics of Coordination Compounds, 2009, Sapporo, Japan, **Poster**.
6. 7th SUPRAPHONE MEETING, 2010, Bonn, **Oral Presentations**.

COMPETENCES AND PERSONAL SKILLS:

Technical skills:

1. **OLED** (*Organic light emitting diode*) and **LEEC** (*Light-emitting electrochemical cell*) preparation: Glove-box full-maintenance and use; configuration and use of the high-vacuum thin film deposition evaporator system; OLEDs electrical (I-V-L) and optical characterization; Spin-coating and Profilometer
2. **Design of electroluminescent materials.**
3. **Organic, organometallic, inorganic synthesis and molecular characterization:** FT-IR, UV-VIS Spectrometer, NMR, Single Crystal X-ray diffraction, Glove-box, Schlenk-line techniques and Column chromatography.
4. **Photophysical and electrochemical characterization:** Steady state (absorption and emission),

Freeze-pump-thaw sample degassing, Quantum yield determination, Integrating Sphere Measurement System and Cyclic Voltammetry.

5. Preparation of manuscripts for scientific publications, patents and research proposals

Teaching experience:

1. Practical courses on "Spectroscopy and Analytical Chemistry Laboratory" at National Tsing Hua University (2005).
2. Supervisor of undergraduate student research work.
3. Co-Supervisor of Master student (Mr. Noviyana Darmawan) (2009)
"Zwitterionic Iridium (III) Complexes, New Type of Deep Blue Phosphorescence Emitter"

Computer skills:

Operating system (Windows), Microsoft Office, Data processing (MestreC, ChemOffice, Origin, SHELXL, Diamond), Bibliography tools (Scifinder Scholar, ISI Web of Knowledge, EndNote, Cambridge Crystallographic Data Base).

Other competences:

Research projects were in collaboration with Siemens, BASF and Merck.

LANGUAGES: Mandarin (mother tongue), Taiwanese, English (fluent), German (basic).

REFERENCES:

1. Prof. Luisa De Cola, Email: decola@uni-muenster.de

Physikalisches Institut Westfälische Wilhelms-Universität Münster, Germany

Prof. Yun Chi, Email: ychi@mx.nthu.edu.tw

Department of Chemistry, National Tsing Hua University, Taiwan, R.O.C

2. Prof. Pi -Tai Chou, Email : chop@ntu.edu.tw

Department of Chemistry, National Taiwan University, Taipei, Taiwan, R.O.C.

3. Prof. Chih-Chieh Wang, Email: ccwang@scu.edu.tw

Department of Science, Soochow University, Taiwan, R.O.C