

個人履歷與著作目錄

Curriculum Vitae (CV) of Chu-Chen Chueh (闕居振)



General Information

Gender: Male

Date of Birth: 11/02/1981

Present address: 6245 NE Radford Dr. Apt. 2613, Seattle, WA 98115

Present telephone: (US Cell Phone):+1-2066963278

Permanent Telephone: (M)+886-955003733 (O)+886-7-7512153

Permanent Address: 18F-3, No.2, Ln. 54, Siwei 2nd Rd., Lingya Dist., Kaohsiung City 802, Taiwan (R.O.C.);
高雄市苓雅區四維二路 54 巷 2 號 18 樓之三

E-Mail: chueh1981@gmail.com; f93524034@ntu.edu.tw; ccchueh@uw.edu

Education

- **07/2004-01//2010 Ph. D., Chemical Engineering, National Taiwan University**
Thesis title: “Syntheses, Morphology, and Device Applications of Donor-Acceptor Semiconducting Polymer Systems. (電子施體/受體高分子系統之合成、形態及元件應用)”
Advisor: Wen-Chang Chen (陳文章)
- **09/2000-06/2004 B.S., Chemical Engineering, National Taiwan University**

Research Experience

- **04/2011-Present Visiting Post-Doctoral Research Scientist**
Dept. of Mater. Sci. & Eng., University of Washington, Seattle, Washington, USA.
Project : “Material, Interface, and Device Engineering for Organic/Polymeric Based Memory Devices and Solar Cell Devices”
Supervisor: Professor Alex, K.-Y., Jen
Fellowship: Postdoctoral Research Abroad Program sponsored by National Science Council (人才培育計畫).
Publication: Journal paper: 17; conference paper: 3 (at present; see publication list for details)
- **07/2004-01/2010 Graduate Student**
Dept. of Chem. Eng., National Taiwan University
Project: “Syntheses, Morphology, and Device Applications of Donor-Acceptor Semiconducting Polymer Systems.”
Publication: Journal paper: 13; conference paper: 10 (see publication list for details)

Field of Specialty & Lab Skills

- General skills for synthesis and characterization of organic compounds
- Design, synthesis and characterization of polymers
- Fabrication of Light-Emitting Diodes、Field-Effect Transistors、Polymer Memory, and Photovoltaic Devices (including Glove Box, Thermal Evaporator, E-beam Evaporator, Photovoltaic Measurement

- System, I-V semiconductor analyzer, Luminance-Current-Voltage measurement)
- Analytical techniques: NMR, FTIR, GC-MS, HPLC, Viscometer, Gel Permeation Chromatographer (GPC), UV/Visible/NIR Spectrophotometer, Photoluminescence Spectrometer, Thermogravimetric Analyzer (TGA), Differential Scanning Calorimeter (DSC), Cyclic Voltammetry (CV), Atomic Force Microscopy (AFM), I-V Semiconductor Analyzer
 - Computer skills: MS Word, MS PowerPoint, MS Excel, ChemDraw, SciFinder, MiePlot, and Gaussian 03.

Awards & Honors

- 高分子年會光電高分子壁報論文獎佳作, 2008
- The Scholarship of Chang Xin (Eternal) Chemical Company, 2009
- 高分子年會光電高分子壁報論文獎第三名, 2010

Title:

“Rational Interfacial, Optical, and Device Engineering for High-Performance Polymer Solar Cells”

Abstract:

In addition to the advances in controlled synthesis of organic conjugated polymers, innovative device engineering on bulk-heterojunction devices are also critical for achieving high performance. The performance of polymer solar cells is strongly dependent on their efficiency in harvesting light, exciton dissociation, charge transport, and charge collection at the metal/organic/metal oxide interfaces. In this presentation, an integrated study of combining interface, optical, and device engineering to significantly improve the performance of polymer photovoltaic cells will be demonstrated. Several optical engineering strategies will be introduced and discussed to explore the full promise of polymer solar cells. We have also developed several novel strategies to modify the interface of bulk-heterojunction devices and create new device architectures to fully explore their potential for solar window

Publication

Journal papers: 30 (published, first author: 8)

Conference papers: 13

- **Journal papers (*: corresponding author)**

Publication for works in graduate school (polymer light-emitting diode, field-effect transistor, and polymer memory)

1. W. Y. Lee, K. F. Cheng, T. F. Wang, **C. C. Chueh**, W. C. Chen*, C. S. Tuang, and J. L. Lin, “Effects of Acceptors on the Electronic and Optoelectronic Properties of Fluorene-Based Donor-Acceptor-Donor Copolymers”, *Macromol. Chem. Phys.* **2007**, 208, 1919-1927. (2013 IF = 2.338, 19/83 POLYMER SCIENCE)
2. W. Y. Lee, C. W. Chen, **C. C. Chueh**, and W. C. Chen*, “Synthesis of New Fluorene-Indolocarbazole Alternating Copolymers for Light-Emitting Diodes and Field Effect Transistors”, *Polymer Journal* **2008**, 40, 249-255. (2013 IF = 1.496, 37/83 POLYMER SCIENCE)
3. K. F. Cheng, **C. C. Chueh**, C. H. Lin, and W. C. Chen*, “Synthesis, Properties, and Field Effect Transistor Characteristics of New Thiophene-[1,2,5]thiadiazolo[3,4-q]quinoxaline-Thiophene based Conjugated Polymers”, *J. Polym Sci. Part A: Polym. Chem.* **2008**, 46, 6305-6316. (2013 IF = 3.543, 12/83 POLYMER SCIENCE)
4. M. H. Lai, **C. C. Chueh**, W. C. Chen*, J. L. Wu, and F. C. Chen, “Synthesis and Properties of New Dialkoxyphenylene Quinoxaline based Donor-Acceptor Conjugated Polymers and Their Applications on Thin Film Transistors and Solar Cells”, *J. Polym Sci. Part A: Polym. Chem.* **2009**, 47, 973-985. (2013 IF = 3.543, 12/83 POLYMER SCIENCE)
5. J. H. Tsai, **C. C. Chueh**, M. H. Lai, C. F. Wang, W. C. Chen*, B. T. Ko, and C. Ting, “Synthesis of New Indolocarbazole-Acceptor Alternating Conjugated Copolymers and Their Applications to Thin Film Transistors and Photovoltaic Cells”, *Macromolecules* **2009**, 42, 1897-1905. (2013 IF = 5.521, 3/83 POLYMER SCIENCE)
6. W. L. Lee, K. F. Cheng, C. L. Liu, S. T. Lin, **C. C. Chueh**, F. Y. Tsai, and W. C. Chen*, “High Hole Mobility From Thiophene-Thienopyrazine Copolymer based Thin Film Transistors”, *J. Polym. Res.* **2009**, 16, 239-244. (2013 IF = 2.019, 27/83 POLYMER SCIENCE)
7. **C. C. Chueh**,[±] N. H. You,⁺ C. L. Liu, M. Ueda*, and W. C. Chen*, “Synthesis and Memory Device Characteristics of New Sulfur-Donor Containing Polyimides”, *Macromolecules* **2009**, 42, 4456-4463. (2013 IF = 5.521, 3/83 POLYMER SCIENCE) (+: Equal Contribution)
8. H. W. Chang, K. H. Lin, **C. C. Chueh**, G. S. Liou*, and W. C. Chen*, “New P-type of Poly(4-methoxy-triphenylamine)s Derived by Coupling Reactions: Synthesis, Electrochromic Behaviors, and Hole Mobility”, *J. Polym Sci. Part A: Polym. Chem.* **2009**, 47, 4037-4040. (2013 IF = 3.543, 12/83 POLYMER SCIENCE)
9. **C. C. Chueh**, T. Higashihara,[#] J. H. Tsai, M. Ueda*, and W. C. Chen*, “All-conjugated diblock copolymer of poly(3-hexylthiophene)-block-poly(3-phenoxyethylthiophene) for field-effect transistor and photovoltaic applications”, *Org. Electron.* **2009**, 10, 1541-1548. (2013 IF = 3.836, 34/239 MATERIALS SCIENCE, MULTIDISCIPLINARY) ([#]: Co-first author)
10. **C. C. Chueh**, M. H. Lai, J. H. Tsai, C. F. Wang, and W. C. Chen*, “Syntheses, Properties, and Field

Effect Transistors of Small Band Gap Quinoxaline- and Thienopyrazine-Vinylene/Ethynylene Conjugated Polymers”, *J. Polym. Sci. Part A: Polym. Chem.* **2010**, 48, 74-81. (2013 IF = 3.543, 12/83 POLYMER SCIENCE)

11. **C. C. Cheuh**,[±] T. Kuorosawa,⁺ C. L. Liu, T. Higashihara, M. Ueda*, and W. C. Chen*, “High Performance Volatile Polymeric Memory Devices Based on Novel Triphenylamine-based Polyimides Containing Mono- or Dual-mediated Phenoxy Linkages”, *Macromolecules* **2010**, 43, 1236-1244. (2013 IF = 5.521, 3/83 POLYMER SCIENCE) (+: Equal Contribution)
12. J. H. Tsai, **C. C. Cheuh**, W. C. Chen*, C. Y. Yu, G. W. Hwang, C. Ting, E. C. Chen, and H. F. Meng, “New Thiophene-Phenylene-Thiophene (TPT)-Acceptor Random Conjugated Copolymers For Optoelectronic Applications”, *J. Polym. Sci. Part A: Polym. Chem.* **2010**, 48, 2351-2360. (2013 IF = 3.543, 12/83 POLYMER SCIENCE)
13. M. H. Lai, J. H. Tsai, **C. C. Chueh**, C. F. Wang, and W. C. Chen*, “Syntheses of New Carbazole-Containing Donor-Acceptor Alternating Copolymers and Their Applications on Thin Film Transistors and Solar Cells”, *Macromol. Chem. Phys.* **2010**, 211, 2017-2025. (2013 IF = 2.338, 19/83 POLYMER SCIENCE)

Publication for works in post-doctoral research of University of Washington (polymer solar cell)

14. C. Z. Li, S. C. Chien, H. L. Yip, **C. C. Chueh**, F. C. Chen, Y. Matsuo, E. Nakamura, Alex K. Y. Jen*, “Facile synthesis of a 56p-electron 1,2-dihydromethano-[60]PCBM and its application for thermally stable polymer solar cells”, *Chem. Commun.* **2011**, 47, 10082-10084. (2013 IF = 6.378, 19/152 CHEMISTRY, MULTIDISCIPLINARY)
15. C. Z. Li, **C. C. Chueh**, H. L. Yip, K. M. O’Malley, W. C. Chen, Alex K. Y. Jen*, “Effective Interfacial Layer to Enhance Efficiency of Polymer Solar Cells via Solution-Processed Fullerene-Surfactants”, *J. Mater. Chem.* **2012**, 22, 8574-8578. (2012 IF = 5.968, 17/232 MATERIALS SCIENCE, MULTIDISCIPLINARY) (Highlighted Hot Article in May 2012, <http://blogs.rsc.org/jm/2012/05/10/hot-article-improving-the-organic-metal-interface-in-polymer-solar-cells/>)
16. J. Zou, H. L. Yip, Y. Zhang, Y. Gao, S. C. Chien, K. M. O’Malley, **C. C. Chueh**, H. Z. Chen, Alex K. Y. Jen*, “High-Performance Inverted Polymer Solar Cells: Device Characterization, Optical Modeling, and Hole-Transporting Modifications”, *Adv. Funct. Mater.* **2012**, 22, 2804-2811. (2013 IF = 9.765, 11/239 MATERIALS SCIENCE, MULTIDISCIPLINARY, 6/69 NANOSCIENCE & NANOTECHNOLOGY)
17. C. Z. Li, **C. C. Chueh**, H. L. Yip, J. Y. Zou, W. C. Chen, Alex K. Y. Jen*, “Evaluation of Structure-property Relationships of Solution-processible Fullerene Acceptors and Their N-Channel Field-Effect Transistor Performance”, *J. Mater. Chem.* **2012**, 22, 14976-14981. (2012 IF = 5.968, 17/232 MATERIALS SCIENCE, MULTIDISCIPLINARY)
18. Y. Zhang, J. Zou, **C. C. Chueh**, H. L. Yip, Y. Sun, Alex K. Y. Jen*, “Significant Improved Polymer Photovoltaic Cells Made from a Partially Fluorinated Cyclopentadithiophene/Benzothiadiazole Conjugated Polymer”, *Macromolecules* **2012**, 45, 5427-5435. (2013 IF = 5.521, 3/83 POLYMER SCIENCE)
19. E. C. Chen, H. C. Yeh, Y. C. Chao, H. F. Meng*, H. W. Zan, Y. C. Liang, C. P. Huang, T. M. Chen*, C. F. Wang, **C. C. Chueh**, W. C. Chen*, S. F. Horng, “Infrared proximity sensor using organic light-emitting

- diode with quantum dots converter”, *Org. Electron.* **2012**, 13, 2312-2318. (2013 IF = 3.836, 34/239 MATERIALS SCIENCE, MULTIDISCIPLINARY)
20. **C. C. Chueh**,⁺ Y. X. Xu,⁺ H. L. Yip, F. Z. Ding, Y. X. Li, C. Z. Li, X. S. Li, W. C. Chen, Alex K. Y. Jen*, “Improved Charge Transport and Absorption Coefficient in Indacenodithieno[3,2-b]thiophene-based Ladder-Type Polymer Leading to Highly Efficient Polymer Solar Cells”, *Adv. Mater.* **2012**, 24, 6356-6361. (2013 IF = 14.829, 6/239 MATERIALS SCIENCE, MULTIDISCIPLINARY, 3/69 NANOSCIENCE & NANOTECHNOLOGY) (+: Equal Contribution)
21. J. F. Salinas, H. L. Yip, **C. C. Chueh**, C. Z. Li, J. L. Maldonado, Alex K. Y. Jen*, “Optical design of transparent thin metal electrodes to enhance in-coupling and trapping of light in flexible polymer solar cells”, *Adv. Mater.* **2012**, 24, 6362-6367. (2013 IF = 14.829, 6/239 MATERIALS SCIENCE, MULTIDISCIPLINARY, 3/69 NANOSCIENCE & NANOTECHNOLOGY)
22. **C. C. Chueh**, S. C. Chien,[#] H. L. Yip, J. F. Salinas, C. Z. Li, K. S. Chen, F. C. Chen, W. C. Chen, Alex K. Y. Jen*, “Toward High-Performance Semi-Transparent Polymer Solar Cells: Optimization of Ultra-Thin Light Absorbing Layer and Transparent Cathode Architecture”, *Adv. Energy Mater.* **2013**, 3, 417-423. (2013 IF = 10.043, 10/239 MATERIALS SCIENCE, MULTIDISCIPLINARY) ([#]: Co-first author)
23. **C. C. Chueh**,⁺ X. Yang,⁺ C. Z. Li, H. L. Yip, P. P. Yin, H. Z. Chen*, W. C. Chen, Alex K. Y. Jen*, “High-Efficiency Polymer Solar Cells Achieved by Doping Plasmonic Metallic Nanoparticles into Dual Charge Selecting Interfacial Layers to Enhance Light Trapping”, *Adv. Energy Mater.* **2013**, 3, 666-673. (2013 IF = 10.043, 10/239 MATERIALS SCIENCE, MULTIDISCIPLINARY) (+: Equal Contribution)
24. C. Z. Li, **C. C. Chueh**, H. L. Yip, F. Z. Ding, X. S. Li, Alex K. Y. Jen*, “Solution-Processible Highly Conducting Fullerenes”, *Adv. Mater.* **2013**, 25, 2457-2461. (2013 IF = 14.829, 6/239 MATERIALS SCIENCE, MULTIDISCIPLINARY, 3/69 NANOSCIENCE & NANOTECHNOLOGY)
25. Y. X. Xu, **C. C. Chueh**, H. L. Yip, C. Y. Chang, P. W. Liang, J. Intemann, W. C. Chen, Alex K. Y. Jen*, “Indacenodithieno[3,2-b]thiophene-Based Broad Bandgap Polymers for High Efficiency Polymer Solar Cells”, *Polymer Chemistry.* **2013**, 4, 5220-5223. (2013 IF = 5.231, 5/83 POLYMER SCIENCE)
26. C. Z. Li, **C. C. Chueh**, F. Z. Ding, H. L. Yip, P. W. Liang, X. S. Li, Alex K. Y. Jen*, “Doping of Fullerenes via Anion-Induced Electron Transfer and Its Implication for Surfactant Facilitated High Performance Polymer Solar Cells”, *Adv. Mater.* **2013**, 25, 4425-4430. (2013 IF = 14.829, 6/239 MATERIALS SCIENCE, MULTIDISCIPLINARY, 3/69 NANOSCIENCE & NANOTECHNOLOGY)
27. Y. X. Li, J. Zou, H. L. Yip, C. Z. Li, Y. Zhang, **C. C. Chueh**, J. Intemann, Y. X. Xu, P. W. Liang, Y. Chen*, Alex K. Y. Jen*, “Side-Chains Effect on Cyclopentadithiophene/Fluoro-benzothiadiazole Based Low Bandgap Polymers and Their Applications for Polymer Solar Cells”, *Macromolecules* **2013**, 46, 5497-5503. (2013 IF = 5.521, 3/83 POLYMER SCIENCE)
28. **C. C. Chueh**, K. Yao, H. L. Yip, C. Y. Chang, Y. X. Xu, K. S. Chen, C. Z. Li, P. Liu, F. Huang, Y. W. Chen, W. C. Chen, Alex K. Y. Jen*, “Non-Halogenated Solvents for Environmental Friendly Processing of High-Performance Bulk-Heterojunction Polymer Solar Cells”, *Energy Environ. Sci.* **2013**, 6, 3241-3248. (2013 IF = 11.653, 10/152 CHEMISTRY, MULTIDISCIPLINARY, 2/133 ENGINEERING, CHEMICAL)
29. J. J. Intemann, K. Yao, Y. X. Li, H. L. Yip, Y. X. Xu, P. W. Liang, **C. C. Chueh**, F. Z. Ding, X. Yang, X. S. Li, Y. W. Chen*, Alex K. Y. Jen*, “Highly Efficient Inverted Organic Solar Cells Through Material

and Interfacial Engineering of Indacenodithieno[3,2-*b*]thiophene-Based Polymers and Devices”, *Adv. Funct. Mater.* **2013**, ASAP.

30. Y. C. Chiu, T. Y. Chen, **C. C. Chueh**, H. Y. Chang, K. Sugiyama, Y. J. Sheng, A. Hirao, W. C. Chen*, “High Performance Nonvolatile Transistor Memories of Pentacene Using the Electrets of Star-branched P-type Polymers and Their Donor/Acceptor Blends”, *J. Mater. Chem. C* **2013**, in press.

• **Conference papers**

1. **C. C. Chueh**, W. Y. Lee, K. F. Cheng, and W. C. Chen, “Synthesis and Optoelectronic Properties of Poly(quinoxaline vinylene) and Its Random Copolymer with Fluorene”, Proceeding of the 30th ROC Polymer Symposium, Taipei, Taiwan **2007**. (Poster)
2. W. Y. Lee, K. F. Cheng, T. F. Wang, **C. C. Chueh**, W. C. Chen, C. S. Tuan, and J. L. Lin, “Effects of Acceptors on the Electronic and Optoelectronic Properties of Fluorene Based Donor-Acceptor-Donor Copolymers” The 233rd ACS National Meeting, March 25-29, Chicago, USA **2007**. (Poster)
3. **C. C. Chueh**, W. Y. Lee, and W. C. Chen, “Synthesis and Optoelectronic Properties of Poly(quinoxaline vinylene) and Its Random Copolymer with Fluorene”, The 233rd ACS National Meeting, March 25-29, Chicago, USA **2007**. (Poster)
4. W. Y. Lee, C. W. Chen, **C. C. Chueh**, C. C. Yang, and W. C. Chen, “Synthesis of New Fluorene-Indolocarbazole Alternating Copolymers for Light-Emitting Diodes and Field Effect Transistors”, Proceeding of the 31th ROC Polymer Symposium, Hsinchi, Taiwan **2008**. (Poster)
5. **C. C. Chueh**, M. H. Lai, and W. C. Chen, “Synthesis of New Acceptor-vinylene Alternating Copolymers and Their Thin-Film Transistor Devices”, MACRO 2008, Jun. 29-Jul. 4, Taipei, Taiwan **2008**. (Poster)
6. K. F. Cheng, **C. C. Chueh**, C. H. Lin, and W. C. Chen, “Synthesis, Properties, and Field Effect Transistor Characteristics of New Thiophene-[1,2,5]thiadiazolo[3,4-*g*]quinoxaline-Thiophene based Conjugated Polymers”, MACRO 2008, Jun. 29-Jul. 4, Taipei, Taiwan **2008**. (Poster)
7. **C. C. Chueh**, C. F. Wang, M. H. Lai, and W. C. Chen, “Synthesis of New Acceptor-Vinylene/Ethynylene Alternating Copolymers and their Thin Film Transistor Characteristics”, Polycondensation 2008, Sep. 8-11, Tokyo, Japan **2008**. (Poster)
8. J. H. Tsai, **C. C. Chueh**, C. Ting, B. T. Ko, and W. C. Chen, “Synthesis of New Indolocarbazole-Acceptor Conjugated Copolymers and Their Thin Film Transistor and Solar Cell Applications”, Polycondensation 2008, Sep. 8-11, Tokyo, Japan **2008**. (Poster)
9. J. H. Tsai, **C. C. Chueh**, M. H. Lai, C. F. Wang, W. C. Chen, B. T. Ko, and C. Ting, “Synthesis of New Indolocarbazole-Acceptor Alternating Conjugated Copolymers and Their Applications to Thin Film Transistors and Photovoltaic Cells”, Proceeding of the 32th ROC Polymer Symposium, Taipei, Taiwan **2009**. (Oral, co-author.)
10. M. H. Lai, **C. C. Chueh**, W. C. Chen, J. L. Wu, and F. C. Chen, “Synthesis and Properties of New Dialkoxyphenylene Quinoxaline based Donor-Acceptor Conjugated Polymers and Their Applications on Thin Film Transistors and Solar Cells”, Proceeding of the 32th ROC Polymer Symposium, Taipei, Taiwan **2009**. (Oral, co-author)
11. **C. C. Chueh**, H. L. Yip, X. Yang, C. Z. Li, J. F. S. Torres, and Alex K. Y. Jen, “Device Engineering for

High-efficiency Semi-Transparent and Plasmonic Polymer Solar Cell” ORCAS Conference 2012, September 4-6, San Juan Island, Washington, USA **2012**. (Poster)

12. C. Z. Li, **C. C. Chueh**, H. L. Yip, K. M. O’Malley, and Alex K. Y. Jen, “Functional Fullerenes for Organic Photovoltaics” ORCAS Conference 2012, September 4-6, San Juan Island, Washington, USA **2012**. (Poster)
13. **C. C. Chueh**, C. Z. Li, W. C. Chen, and Alex K. Y. Jen, “Solution-Processible n-doped Fullerenes and its Implication for surfactant Facilitated High-Performance Polymer Solar Cells” The 13th Pacific Polymer Conference, November 17-22, Kaohsiung, Taiwan **2013**. (Oral)