Thin Films & Nano Devices Lab.

Dong-Sing Wuu

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Research Interests

Solid-State Light-Emitting Devices & Displays、Wide Bandgap Materials and Devices、IOT Sensing Materials and Devices、Thin Film Technology、MOCVD

Introduction to laboratory

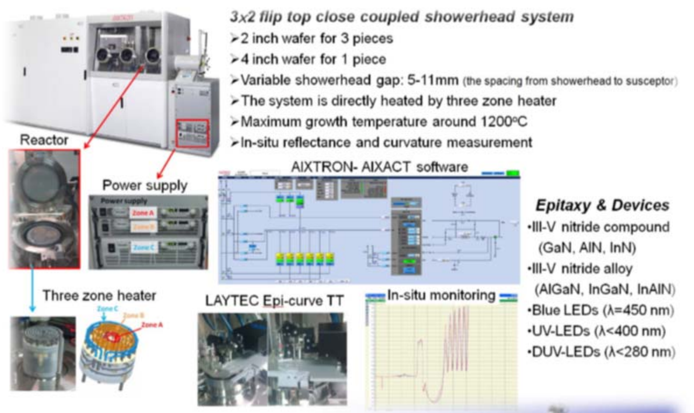
- ***Solid-State Light-Emitting Devices***
- ***Advanced Photoelectric Sensor***
- ***Quantum Dot Display***
- ***Advanced Flat-Panel Display Technology***
- ***Si Photovoltaic Devices***

國立暨南國際大學
National Chi Nan University

Laboratory equipment

Epitaxy

- *Metal-organic Chemical Vapor Deposition*
- *Pulsed Laser Deposition*
- *Hydride vapor phase expitaxy*

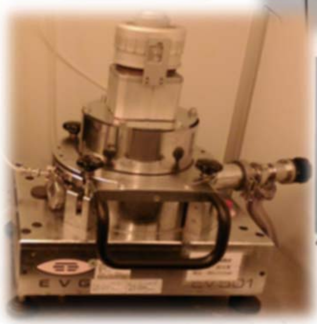


5 Zone resistance Heater

國立暨南國際大學
National Chi Nan University

Process

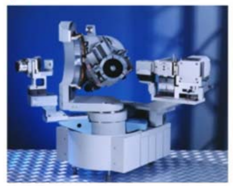
- *Plasma-Enhanced Chemical Vapor Deposition*
- *Sputtering*
- *Atomic Layer Chemical Vapor Deposition*
- *Inductively Coupled Plasma-reactive Ion Etching*
- *E-Gun*
- *Thermal*
- *Laser Cutting machine*
- *Wafer Bonding System*

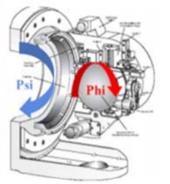


Measurement

- *High Resolution XRD*
- *Confocal Micro-Raman Spectrometer*
- *Glow Discharge Optical Emission Spectrometer*
- *Source Imaging Goniometer*
- *Thin Film Stress Measurement Systems*
- *Thermal and Radiometric Characterization of LEDs*
- *Atomic Force Microscope*
- *Goniophotometer*
- *α-step*

X-ray sources: 18 kW Rigaku rotating anode generator & 2.2 kW Philips sealed tube source
Wavelength: Cu Kα (1.5405 Å)
Monochromator: High flux hybrid monochromator or 4-crystal Ge(220)/(440)
Diffracted beam optics: receiving slits & Ge (220) analyzer for triple axes
Goniometer: open Eulerian cradle
Detector: sealed proportional counter





- X: 100±0.01 mm
- Y: 100±0.01 mm
- Z: 10±0.001 mm
- Phi: 720±0.01º
- Psi: 180±0.01º

AMOE

Nano Device Optical Charactization Lab.

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Hsiang Chen is the Chair and a distinguished Professor in Applied Materials and Optoelectronic Engineering Department at National Chi Nan University, Taiwan. He was born in Taipei, Taiwan, 1973. He received the B.S. and M.S. degree from the Department of Electrical Engineering, National Taiwan University, Taiwan in 1995 and 1997. He received the Ph.D. degree from University of California, Irvine in 2008. In 2008, he joined the faculty at National Chi Nan University, Taiwan. He has published more than 100 papers in peer-reviewed journals. His current research areas focus on ZnO/ZnS core shell nanostructures, organic/inorganic hybrid gas sensors, high-k gate dielectrics, extended-gate field-effect transistors, and GaN optoelectronics.

Research Interests

Nanomaterials
GaN optoelectronic devices
CIGS solar film
Fluorine implantation
Bit line Reliability Improvements
Silicon-based pH biosensing membrane

Awards

2016

National Chi Nan University Teaching Merit Award

2013 and 2016

National Chi Nan University Teaching Merit Award

2015

Certificate of Merit for The 2015 International Conference of Electrical and Electronics Engineering, London

Book

1. H. Chen, "Exploration of the Potential Defects in GaN HEMTs with Hyperspectrum Image Techniques,"Verlag Dr. Muller, Saarbrucken, Germany, 2009.

Reviewer experience

International Journal of Electronics, Materials Letters, Advances in Materials Science and Engineering, Journal of Alloys and Compounds, IEEE Transactions on Electron Devices, Journal of Lightwave Technology, Thin Solid Films, ECS Solid State Letters, International Journal of Physical Sciences, Materials Science & Engineering B, Vacuum, Solid State Electronics, International Journal of Electronics Letters, Microelectronic Reliability, Ceramics International, Journal of Crystal Growth, International Journal of Electronics Letters, Materials Science in Semiconductor Processing , Results in Physics, IEEE Electron Device Letters, Thin Solid Films, Journal of Nanomaterials, International Journal for Light and Electron Optics, Microelectronic Engineering, Journal of Materials Chemistry C, IEEE Journal of Quantum Electronics, Journal of Hazardous Materials, RSC Advances, Materials Research Express, IEEE Transactions on NanoBioscience, Journal of Materials Science: Materials in Electronics, Dalton Transactions, IEEE Transactions on Device and Materials Reliability, Nanoscale, ACS Applied Materials & Interfaces, Advances in Materials Science and Engineering.

Instrument

Olympus CCD & Optical Microscopy

Hydrothermal tank

Oscilloscope

Waveform generator

Annealing furnace

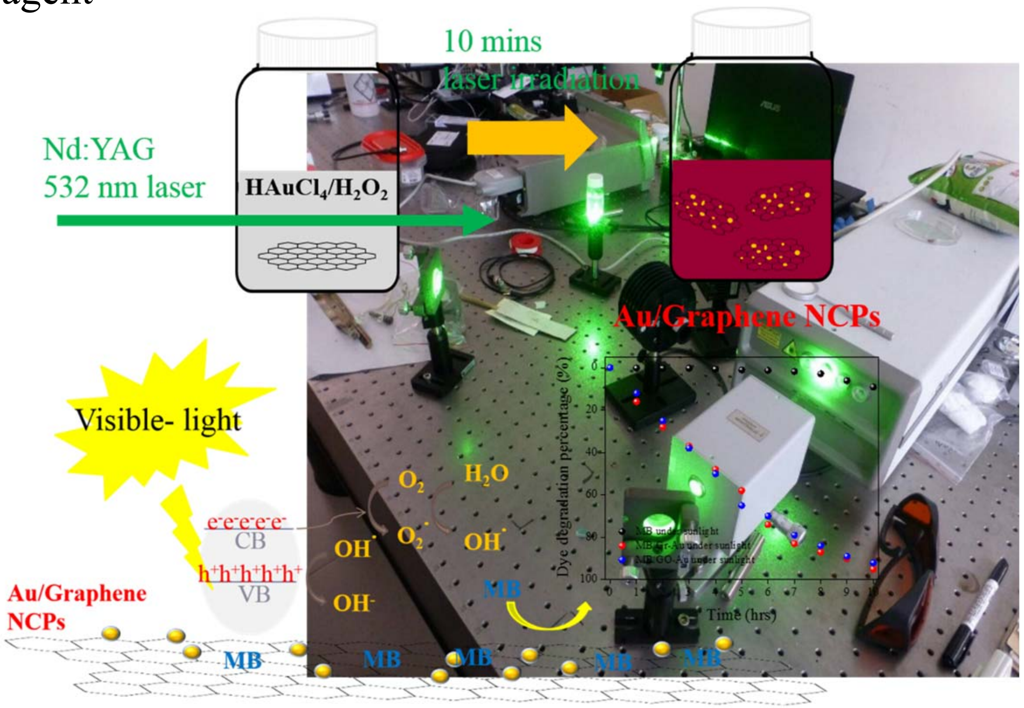
4155C Semi-conductor Analyzer

Vincent K. S. Hsiao

Research interests: (1) Photoelectrics, thermoelectric and photothermoelectric materials; (2) Triboelectrics; (3) Laser-assisted fabrication of nanomaterials; (4) Laser spectroscopy

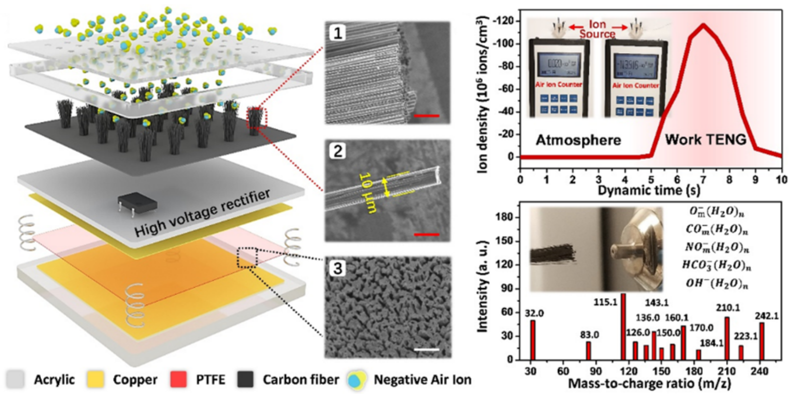
Pulsed laser-induced photolysis of fabricating nanocomposites

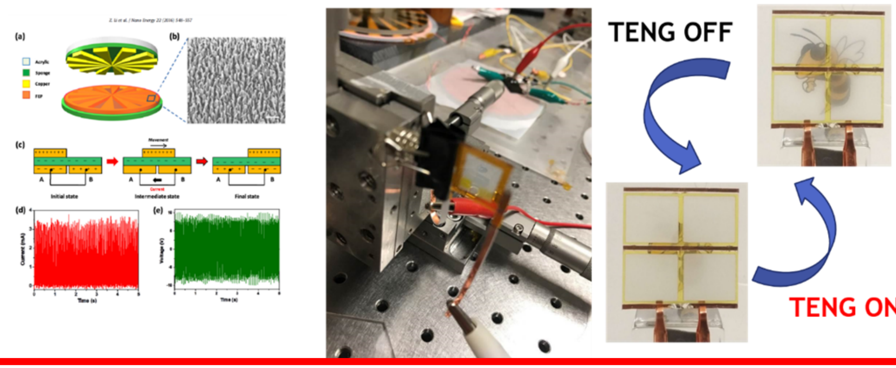
The use of energy from pulsed laser to fabricate nanoparticles or nanocomposite using H2O2 as reducing agent



TRIBOELECTRIC NANOGENERATOR, TENG

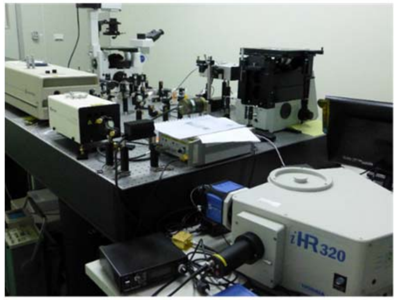
The use of mechanical motion to acturate optoelectroinic device or to generate negative ions.

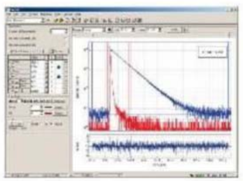


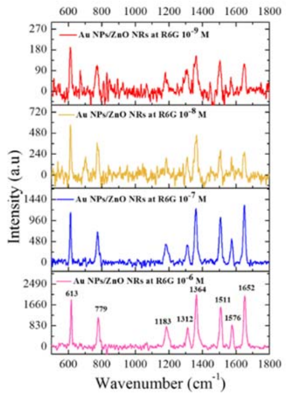


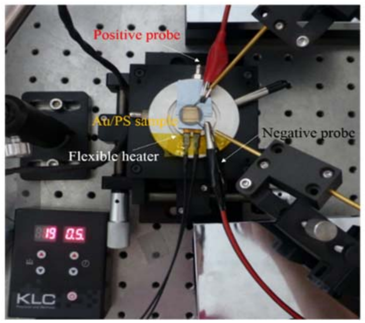
Photoluminescence, thermo-current and photonic measurement

Several systems to measure optical and thermoelectrical properties of nanomaterials



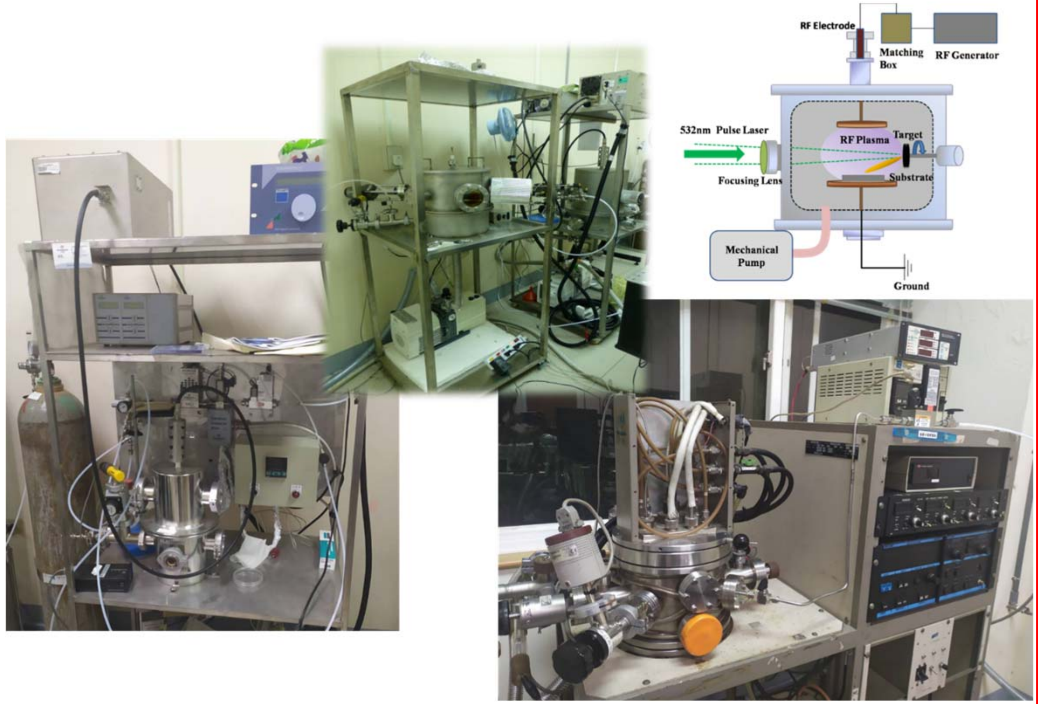






Thin film coating technology

Several systems, sputtering and pulsed-laser deposition to fabricate thin films for the use in the surface Raman scattering substrate and thermoelectric materials.



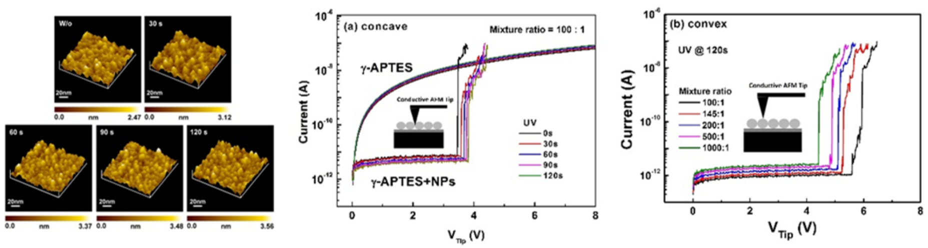
Semiconductor and Micro-Sensing Devices Lab.

Principal investigator

Jing-Jenn Lin received the BS degree in electrical engineering from National Cheng Kung University, Tainan, Taiwan, in 1987. He gained his Ph.D. degree in electrical engineering from National Taiwan University, Taipei, Taiwan, in 1992. He is currently a Professor with the Department of Applied Materials and Optoelectronic Engineering, National Chi Nan University, Puli, Taiwan. His research interests include the ultrathin gate-oxide reliability, biosensors, and composite matrices. (cclin@ncnu.edu.tw)

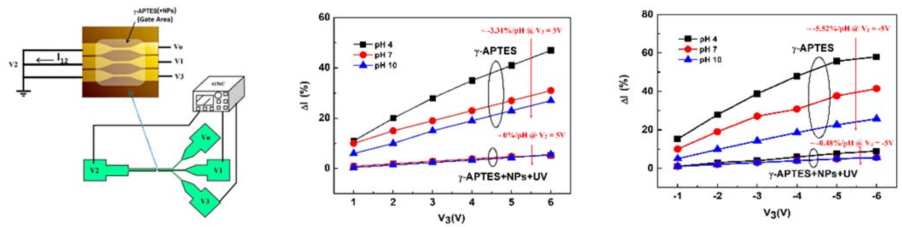
1. Characterization of Nanocomposite Films of γ-APTES and γ-APTES Incorporated with Silicate Nanoparticles.

The I-V characteristic of the γ-APTES membrane with the incorporation of PDMS-treated silicate NPs can act as a dielectric-like material, in which there is a sudden current increase at a certain voltage, which is similar to the dielectric breakdown. Our experimental results demonstrate that not only can the bulk structure sustain a high electric field, but the bulk leakage current can also be greatly improved when the γ-APTES membrane is incorporated with silicate NPs.



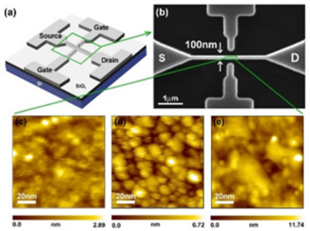
2.Investigation of the electrical interference effect resultant from a biased neighboring poly-Si wires (PSWs) during biosensing.

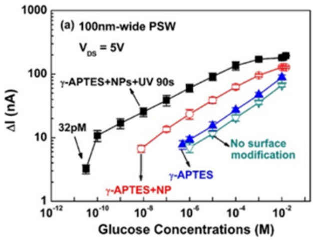
The PSW sensor with γ-APTES+NPs+UV sensing membrane can have higher PSW channel current and much lower channel current deviation errors than does the PSW sensor with γ-APTES sensing membrane. We attribute the improved sensing properties, including higher sensitivity and much better interference immunity to the biased neighboring PSW, to the much smaller surface leakage current of the γ-APTES+NPs+UV membrane.



3.Ultra-sensitive and highly immune to interference polysilicon wire glucose and label-free DNA sensors.

The sensors using a 3 -aminopropyltriethoxysilane and polydimethylsiloxane -treated hydrophobic fumed silica nanoparticle mixture as the sensing membrane.The precise coating technique is completed with the help of focus-ion-beam (FIB) processed capillary atomic -force-microscope (C-AFM) tip.





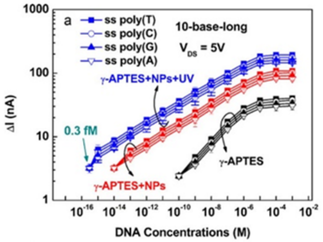


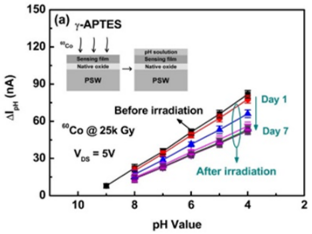
Table 1
Percentage change of ΔI measured at V_{DS} = 5 V for the PSW coated with γ-APTES and γ-APTES + NPs and γ-APTES + NPs + UV layers, respectively, used for glucose detection in the presence of five common interferents, CA, AA, UA, Lys, and AP, under various interferent-to-glucose concentration ratios.

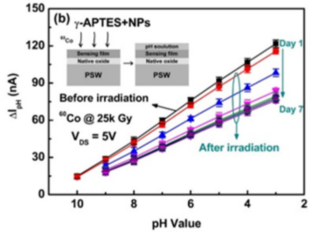
Membrane	Interference substances	Interference-to-glucose concentration ratio							
		0.003:1	0.01:1	0.1:1	1:1	10:1	100:1	300:1	600:1
Percentage changes of ΔI at V_{DS} 5V for a 100 nm-wide PSW									
γ-APTES	CA	–	5.2	5.5	7.2	10	13	16	19
	AA	–	6	6.2	8	12	16	19	23
	UA	–	7	7.2	9.3	15.6	20.7	25	30
	L-Cys	–	8.3	8.5	9	16.2	21.7	26.2	32.4
	AP	–	9.1	9.12	12	17	22.1	27.4	33.5
γ-APTES + NPs	CA	–	2.5	4.3	4.5	5.2	5.7	6.8	7.2
	AA	–	3.8	4.5	4.7	5.4	5.8	7.1	8.3
	UA	–	4.1	4.9	4.9	5.5	6	7.4	8.5
	L-Cys	–	4.3	5.2	5.5	5.7	6.2	7.6	8.7
	AP	–	5	5.2	5.5	7	8.3	9.7	11.5
γ-APTES + NPs + UV	CA	–	–	1.7	2.3	2.3	2.7	3.3	4.2
	AA	–	3.2	3.4	3.4	3.4	3.8	4.5	6.7
	DA	–	2.1	3.7	3.8	3.8	4	5.1	7.4
	L-Cys	–	3.5	4.1	4.2	4.4	5.1	6.3	8.1
	AP	–	4.5	5.1	5.6	6.7	7	6.5	8.7

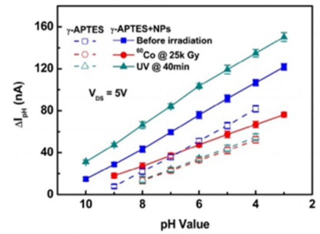
(–) no changes.

4.Gamma-Ray Sterilization Effects in Silica Nanoparticles/ γ-APTES Nanocomposite -Based pH-Sensitive Polysilicon Wire Sensors

The γ-ray irradiation-induced sensitivity degradation of the PSW pH sensor covered with γ-APTES/silica NPs nanocomposite (γ-APTES+NPs) could be restored to a condition even better than prior to γ-ray irradiation by 40 -min of post -sterilization room-temperature UV annealing.







Electrical and Optical Films Lab.

Su-Shia Lin Professor

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Research Interests

Electrical and Optical Films

Nanomaterials

Optical Memory and Optical Data Storage

Optical Design

Publication List

● **Su-Shia Lin**[*], Chung-Kai Peng, Cho-Wei Li, (2019), “Wettability and optical properties of $SnO–SnO_2–Sb_2O_3$ thin films deposited by simultaneous RF and DC magnetron sputtering”, Journal of Alloys and Compounds, Vol. 770, 433-440, *SCI*.

● **Su-Shia Lin**[*], Sheng-You Fan, Yung-Shiang Tsai, (2017), “Effects of annealing on wettability and physical properties of SnO thin films deposited at low RF power densities”, Ceramics International, Vol. 43, 1802-1808, *SCI*.

● **Su-Shia Lin**[*], Yung-Shiang Tsai, Kai-Ren Bai, (2016), “Structural and physical properties of tin oxide thin films for optoelectronic applications”, Applied Surface Science, Vol. 380, 203-209, *SCI*.

● **Su-Shia Lin**[*], Chung-Sheng Liao, (2016), “Effects of the ratio of O_2/Ar pressure on wettability and optical properties of HfO_2 films before and after doping with Al”, Applied Surface Science, Vol. 380, 229-236, *SCI*.

● **Su-Shia Lin**[*], Chung-Sheng Liao, Sheng-You Fan, (2015), “Effects of substrate temperature on properties of HfO_2, HfO_2:Al and HfO_2:W films”, Surface & Coatings Technology, Vol. 271, 269-275, *SCI*.

● **Su-Shia Lin**[*], Yu-Lun Gao, Shao-Yin Hu, Sheng-You Fan, Yung-Shiang Tsai, (2014), “Properties of Ti-doped Al_2O_3 thin films deposited by simultaneous RF and DC magnetron sputtering”, Vacuum, Vol. 107, 225-230, *SCI*.

● **Su-Shia Lin**[*], (2014), “The optical properties of hydrophilic Ti-doped Al_2O_3 films”, Optical Materials, Vol. 36, 1488-1493, *SCI*.

● **Su-Shia Lin**[*], (2014), “Optical properties of HfO_2 nanoceramic films as a function of N–Bi co-doping”, Ceramics International, Vol. 40, 5707-5713, *SCI*.

● **Su-Shia Lin**[*], (2014), “Properties of heavily W-doped TiO_2 films deposited on Al_2O_3-deposited glass by simultaneous rf and dc magnetron sputtering”, Ceramics International, Vol. 40, 217-225, *SCI*.

● **Su-Shia Lin**[*], Chung-Sheng Liao, (2013), “Structure and physical properties of W-doped HfO_2 thin films deposited by simultaneous RF and DC magnetron sputtering”, Surface & Coatings Technology, Vol. 232, 46-52, *SCI*.

● **Su-Shia Lin**[*], Han-Ru Li, (2013), “The optical properties of hydrophilic Hf-doped HfO_2 nanoceramic films”, Ceramics International, Vol. 39, 7677-7683, *SCI*.

● **Su-Shia Lin**[*], (2013), “Effect of fibered morphology on the properties of Al_2O_3 nanoceramic films”, Ceramics International, Vol. 39, 3157-3163, *SCI*.

● **Su-Shia Lin**[*], Chung-Sheng Liao, (2013), “The hydrophobicity and optical properties of the HfO_2-deposited glass”, Ceramics International, Vol. 39, 353-358, *SCI*.

● **Su-Shia Lin**[*], (2012), “The optical properties of Ti-doped TiO_2 nanoceramic films deposited by simultaneous rf and dc magnetron sputtering”, Ceramics International, Vol. 38, 3129-3134, *SCI*.

● **Su-Shia Lin**[*], (2012), “Effect of substrate temperature on the properties of TiO2 nanoceramic films”, Ceramics International, Vol. 38, 2461-2466, *SCI*.

Publication List

● **Su-Shia Lin***, Ding-Kun Wu, (2010), "Effect of RF deposition power on the properties of Al-doped TiO2 thin films", Surface & Coatings Technology, Vol. 204, 2202-2207, *SCI*.
● **Su-Shia Lin***, Ding-Kun Wu, (2010), "Enhanced Optical Properties of TiO_2 Nanoceramic Films by Oxygen Atmosphere", Journal of Nanoscience and Nanotechnology, Vol. 10, No. 2, 1099-1104, *SCI*.
● **Su-Shia Lin***, Ding-Kun Wu, (2010), "The properties of Al-doped TiO_2 nanoceramic films deposited by simultaneous rf and dc magnetron sputtering", Ceramics International, Vol. 36, 87-91, *SCI*.
● **Su-Shia Lin***, (2009), "Optical properties of TiO_2 nanoceramic films as a function of N–Al co-doping", Ceramics International, Vol. 35, 2693-2698, *SCI*.
● **Su-Shia Lin***, Ding-Kun Wu, (2009), "Enhanced optical properties of Al-doped TiO_2 thin films in oxygen or nitrogen atmosphere", Applied Surface Science, Vol. 255, 8654-8659, *SCI*.
● **Su-Shia Lin***, Yuan-Hsun Hung, Shin-Chi Chen, (2009),"Optical properties of TiO_2 thin films deposited on polycarbonate by ion beam assisted evaporation", Thin Solid Films, Vol. 517, 4621-4625, *SCI*.
● **Su-Shia Lin***, Yuan-Hsun Hung, Shin-Chi Chen, (2009), "The Properties of TiO_2 Nanoceramic Films Prepared by Electron Beam Evaporation", Journal of Nanoscience and Nanotechnology, Vol. 9, No. 6, 3599-3605, *SCI*.
● **Su-Shia Lin***, Shin-Chi Chen, Yuan-Hsun Hung, (2009), "TiO_2 nanoceramic films prepared by ion beam assisted evaporation for optical application", Ceramics International, Vol. 35, 1581-1586, *SCI*.
● **Su-Shia Lin***, (2007), "Bi-Ge-Sb-Sn-Te films for reversible phase-change optical recording", Ceramics International, Vol. 33/8, 1627-1630, *SCI*.
● **Su-Shia Lin***, (2007), "Doped Ge-Sb-Te phase-change materials for reversible phase-change optical recording", Ceramics International, Vol. 33/7, 1161-1164, *SCI*.
● **Su-Shia Lin***, J.L.Huang, (2006), "The properties of Ti-doped ZnO films before and after annealing in the different atmosphere", Solid State Phenomena, Vol. 118, 571-576, *SCI*.
● **Su-Shia Lin***, J.L.Huang, (2006), " The Properties of Heavily Al-doped ZnO Films by Simultaneous rf and dc Magnetron Sputtering", Solid State Phenomena, Vol. 118, 305-310, *SCI*.
● **Su-Shia Lin***, (2006), "Bi-Ge-Sb-Te Films for Reversible Phase-Change Optical Recording", Solid State Phenomena, Vol. 118, 293-298, *SCI*.
● Su-Shia Lin*, (2006), "The effect of thickness on the Bi-Ge-Sb-Te films for reversible phase-change optical recording", Materials Science and Engineering B, Vol. 129/1-3, 116-120, SCI.
● Su-Shia Lin*, J.L.Huang, D.F. Lii, (2005), "Effect of substrate temperature on the properties of Ti-doped ZnO films by simultaneous rf and dc magnetron sputtering", Materials Chemistry and Physics, Vol. 90, 22-30, SCI.
● Ding-Fwu Lii*, Jow-Lay Huang, Iau-Jiue Jen, Su-Shia Lin, Pavol Sajgalik, (2005), " Effects of annealing on the properties of indium-tin oxide films prepared by ion beam sputtering", Surface & Coatings Technology, Vol. 192/1, 106-111, SCI.
● Su-Shia Lin, J.L.Huang*, P. Šajgalik, (2005), "The properties of Ti-doped ZnO films deposited by simultaneous RF and DC magnetron sputtering", Surface & Coatings Technology, Vol. 191/2-3, 286-292, SCI.
● Su-Shia Lin, J.L.Huang*, D.F. Lii, (2005), "The effect of thickness on the properties of Ti- doped ZnO films by simultaneous r.f. and d.c. magnetron sputtering", Surface & Coatings Technology, Vol. 190/2-3, 372-377, SCI.
● Su-Shia Lin, J.L.Huang*, P. Šajgalik, (2005), " Effects of substrate temperature on the properties of heavily Al-doped ZnO films by simultaneous r.f. and d.c. magnetron sputtering", Surface & Coatings Technology, Vol. 190/1, 39-47, SCI.
● Su-Shia Lin, J.L.Huang*, (2004), "The effect of thickness on the properties of heavily Al-doped ZnO films by simultaneous rf and dc magnetron sputtering", Ceramics International, Vol. 30/4, 497-501, SCI.
● Su-Shia Lin, J.L.Huang*, P. Šajgalik, (2004), "The properties of heavily Al-doped ZnO films before and after annealing in the different atmosphere", Surface & Coatings Technology, Vol. 185/2-3, 254- 263, SCI.
● Su-Shia Lin, J.L.Huang*, (2004), "Effect of thickness on the structural and optical properties of ZnO films by r.f. magnetron sputtering", Surface & Coatings Technology, Vol. 185/2-3, 222-227, SCI.
● Su-Shia Lin, J.L.Huang*, D.F. Lii, (2004), "The effects of r.f. power and substrate temperature on the properties of ZnO films", Surface & Coatings Technology, Vol. 176/2, 173-181, SCI.
● Su-Shia Lin, J.L.Huang*, (2003), "Microstructure and optical properties of AlOx thin films grown on ZnO-deposited glass", Journal of Materials Research, Vol. 18, No. 8, 1943-1949, SCI.
● Su-Shia Lin, J.L.Huang*, (2003), "Improved crystallinity and optical properties of AlOx thin films by a ZnO Interlayer", Journal of Materials Research, Vol. 18, No. 4, 965-973, SCI.
● Su-Shia Lin, J.L.Huang*, (2003), "Optical properties of ITO/AlOx thin films prepared by reactive d.c. magnetron sputtering", Ceramics International, Vol. 29/7, 771-776, SCI.
● Jow-Lay Huang*, Yin-Tsan Jah, Ching-Yun Chen, Bao-Shun Yau, and Su-Shia Lin, (2000) August, "Reactive Magnetron Sputtering of Indium Tin Oxide Films on Acrylics-Electrical Resistivity and Optical Properties", Journal of Materials Engineering and Performance, Vol.9, 424-427, SCI.

Organic Optoelectronic Materials and Devices Lab.

Li-Hsin Chan Professor

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Research Fields

Energy and Optoelectronic Polymers、Organic Optoelectronic Devices

Publication List

1. P.-T. Sah, W.-C. Chang, J.-H. Chen, H.-H. Wang, **L.-H. Chan,*** "Bimetallic Ag–Au–Ag Nanorods Used to Enhance Efficiency of Polymer Solar Cells", *Electrochimica Acta* **2018**, 259, 293-302.
2. J.-H. Chen, C.-K. Liu, W.-C. Chang, P.-T. Sah, **L.-H. Chan,*** "Structure-Function Relationships in PMA and PMAT Series Copolymers for Polymer Solar Cells", *Polymers* **2018**, 10, 384.
3. C.-K. Liu, Y.-H. Chen, Y.-J. Long, P.-T. Sah, W.-C. Chang, **L.-H. Chan**,* J.-L. Wu, R.-J. Jeng,* S.-C. Yeh, C.-T. Chen,* "Bipolar 9-linked carbazole-π-dimesitylborane fluorophores for nondoped blue OLEDs and red phosphorescent OLEDs", *Dyes and Pigments* **2018**, 157, 101-108.
4. J.-Y. Jheng, P.-T. Sah, W.-C. Chang, J.-H. Chen, **L.-H. Chan,*** Decahedral Gold Nanoparticles for Enhancing Performance of Polymer Solar Cells, *Dyes and Pigments* **2017**, 138, 83-89.
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7. 4 Y.-R. Liu, **L.-H. Chan**,* H.-Y. Tang, Effect of Side Chain Conjugation Lengths on Photovoltaic Performance of Two-Dimensional Conjugated Copolymers That Contain Diketopyrrolopyrrole and Thiophene with Side Chains, *J. Polym. Sci., Part A: Polym. Chem.* **2015**, DOI: 10.1002/pola.27767.
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Chun-Pei Cho

Ph.D, Professor

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Education

BS, Chemistry, National Tsing Hua University
October 1993 – June 1997

MS, Chemistry, National Tsing Hua University
September 1997 – June 1999

Ph.D., Materials Science and Engineering, National Tsing Hua University
September 2001 – January 2006

Employment History

Process Integration Engineer at Mosel Vitelic Inc.
July 1999 – August 2001

Postdoctoral Research Fellow at Institute of Chemistry, Academia Sinica

March 2006 – May 2007

R&D at Array Device Technology Department, AU Optronics
June 2007 – August 2008

Assistant Professor at Department of Applied Materials and Optoelectronic Engineering, National Chi Nan University
August 2008 – January 2015

Associate Professor at Department of Applied Materials and Optoelectronic Engineering, National Chi Nan University

February 2015 – July 2019

Professor at Department of Applied Materials and Optoelectronic Engineering, National Chi Nan University
August 2019 – present

Research Areas

Organic electronic devices

OLEDs, OPVs including DSSCs.

Surface modification, application of self-assembled monolayers (SAMs), atomic layer deposition technique, new electrode structures, photoelectrochemical investigations, nanoscaled characterization, interfacial physical chemistry, charge transport mechanisms, enhanced device performance and longer lifetime, development of solid-state and flexible devices.

Photocatalytic Materials

Binary or ternary nanocomposites, hybrid materials, reusable photocatalysts, surface decoration or doping by various elements, materials characterization, photoelectrochemical investigations, pollutants photodegradation, water splitting and hydrogen generation, surface plasmon resonance effect, photocatalysis mechanism study, improved photocatalytic efficiency, green energy application.

Supercapacitors

Flexible solid-state supercapacitors, carbonaceous active materials, the impacts of doping level and configuration of nitrogen element, application of transition metal carbide materials with porous structures, the synergistic effect of nitrogen-doping and MnO_2, electrochemical properties study, charge transport mechanisms, high specific capacitance and rate capability, good cycling stability, high energy density, enhanced capacitor performance.

國立暨南國際大學
National Chi Nan University

High-Speed Computing Laboratory for Nano-Architectonics of NCNU

Person in charge: Dr./Prof. **Yung-mau Nie**

Position: Associate Professor

Affiliation: Department of Applied Materials and Optoelectronic Engineering, National Chi Nan University (NCNU)

Address: No.1, University Rd., Puli Township, Nantou County 54561, Taiwan

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Education:

1988-1992 BS in Chemical Engineering, National Cheng-Kung University, Taiwan

1993-1998 Ph.D. in Physics, Illinois Institute of Technology, USA

Resume: (Only list important qualifications related to materials/optoelectronics field)

2008- so far Assistant/Associate Professor (full-time faculty), Department of Applied Materials and Optoelectronic Engineering, National Chi Nan University.

2006-2008 MANA Research Associate (Postdoctoral Fellow), World Premium International Center for Materials Nanoarchitectonics (MANA), National Institute for Materials Science, Japan

Research Theoretical Basis:

1. Density Functional Theory (DFT) of electrons' ground state in solid state materials.
2. Quasi-particle many-body theory of electrons' excited states in solid state materials.

Major Research Field:

- DFT-based First-Principles approach to formulate doped magnetic perovskite-oxides based ceramic semiconductors as a new high temperature spin-polarized conduction electron metals, i.e. room temperature ferro-/antiferro-magnetic half-metallic perovskite oxide materials. https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.100.117203
- DFT-based First-principles approach to investigate toroidal structure of ferrotoroidic materials to study the corresponding gigantic experimentally observed magneto-electric response. The study plays a crucial role to develop next generation laser-driven read write access magnetic storage media architected by multiferroic transition metal perovskite oxides. https://aip.scitation.org/doi/10.1063/1.4939780

Laboratory Equipments:

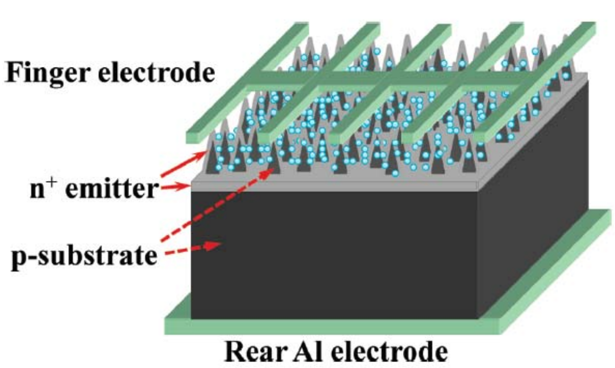
- High speed computing servers and PC clusters for performing large-scale parallel calculations

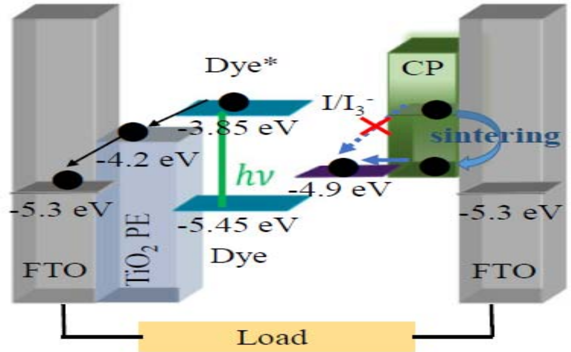
- VASP and WIEN2K codes, all-electron full-potential DFT-based First-principles simulation programs.

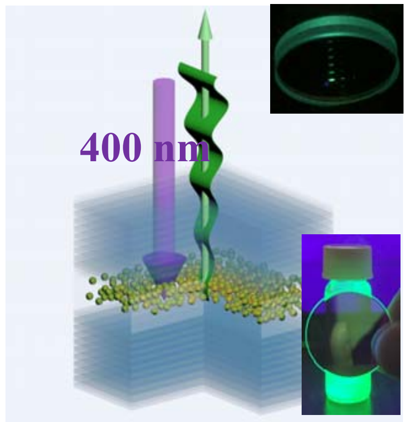
固態電子實驗室
Solid State Electronic Lab

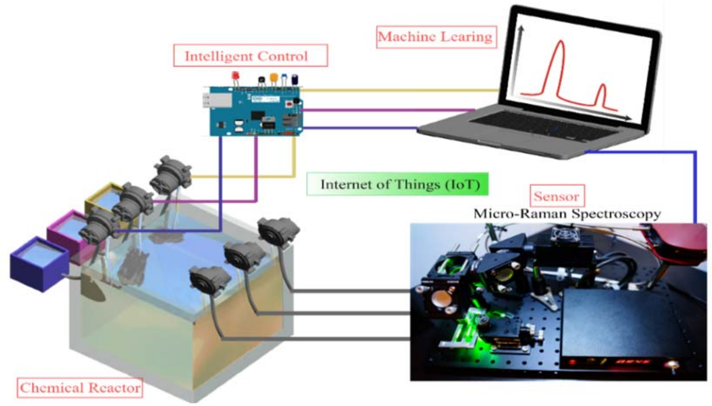
Research Topics

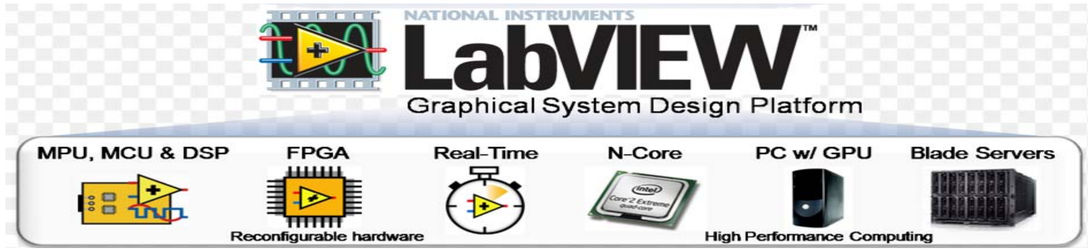
- ◆ Optoelectronic Semiconductor Devices
  - Solar cells
  - LEDs
  - Lasers
  - Photodetectors
- ◆ Nanomaterials
  - Perovskite QDs
  - MoS_2 Nanoflakes
  - Graphene Nanoflakes
  - Si Nanowires
- ◆ Virtual Instruments (LabVIEW)
  - DAQ
  - Instrument Control
  - Arduino (Embedded System)
- ◆ Automatic Optoelectronic Measurement
  - Optomechatronic Integration Engineering
  - Optical System Design











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