Ping-Hung Yeh
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Education Background

09/2002-07/2006 **National Tsing Hua University**
Hsin-Chu, Taiwan

Degree：**Ph.D.**

Major：**Materials Science & Engineering**

09/2000-06/2002 **National Sun Yat-Sen University** Kaohsiung, Taiwan

Degree：**Master**

Major：**Physics**

09/1996-06/2000 **National Sun Yat-Sen University** Kaohsiung, Taiwan

Degree：**B.S.**

Major：**Physics**

Academic Experiences

08/2009-present **Department of Physics, Tamkang University**
New Taipei City, Taiwan

Position：Professor 08/2015-present

Associate professor 08/2012-07/2015
Assistant professor 08/2009-07/2012

- Schottky-gated nanosensors.
- UV, gas, Biological sensor.
- Bio-safety of nanostructures.
- Application for nanostructures

12/2007-06/2009 **Dept. of Materials Science & Engineering,**
Georgia Institute of Technology Georgia, U.S.A

Position：Post-doctoral Research Fellow

- Fabrication and application of silicide nanowire for microelectronics.
- Developing the nanodots combines with the silicide nanowire for electroluminescence.
- Developing the nanowire combines with the haemoglobin for biosensor or biomemory device.

09/2006-12/2007 **Dept. of Materials Science & Engineering,**
National Tsing Hua University Hsinchu, Taiwan

Position：Post-doctoral Research Fellow

- Developing the multilayer nanocrystals for Nonvolatile Memory (NVM) Devices application.
- Developing the I-V and Field Emission measurements for nanocrystals and nanowires.
- Fabrication and application of the nanowire for MOSFET and NVM Device.
- Writing a chapter (Nanocrystals Nonvolatile Memory Device) for the “Hand Book of the Nonvolatile Memory Devices”.
- Translating the “Semiconductor Material and Device Characterization” 3rd Edition from English to Chinese.

Patent 多晶矽薄膜的製造方法以及多晶矽薄膜電晶體的製造方法；中華民國

專利公告號：I228830(2005)

Academic Publication

Journal Papers *: corresponding author

1. C. F. Chang, J. Y. Chen, C. W. Huang, C. H. Chiu, T. Y. Lin, **P. H. Yeh*** and W. W. Wu," Direct Observation of Dual-Filament Switching Behaviors in Ta_2O_5-Based Memristors", Small, 1603116-n/a, (2017).
2. Y. T. Wu, C. W. Huang, C. H. Chiu, C. F. Chang, J. Y. Chen, T. Y. Lin, Y. T. Huang, K. C. Lu, **P. H. Yeh*** and W. W. Wu," Nickel/Platinum Dual Silicide Axial Nanowire Heterostructures with Excellent Photosensor Applications", Nano Letters, **16**, 1086-1091, (2016). (IF:13.779, ▲:3).
3. Y. H. Chen, C. W. Huang, **P. H. Yeh***, J. Y. Chen, T. Y. Lin, C. F. Chang and W. W. Wu," A solid-state cation exchange reaction to form multiple metal oxide heterostructure nanowires", Nanoscale, **8**, 17039-17043, (2016). (IF:2.584).
4. R. A. Patil, M. K. Wei, **P. H. Yeh***, J. B. Liang, W. T. Gao, J. H. Lin, Y. Liou and Y. R. Ma," Size-controllable synthesis of Bi/Bi_2O_3 heterojunction nanoparticles using pulsed Nd:YAG laser deposition and metal-semiconductor-heterojunction-assisted photoluminescence", Nanoscale, **8**, 3565-3571, (2016). (IF:7.760, ▲:3).
5. C. J. Liu, A. Bhaskar, J. J. Yuan, Z. R. Yang, S. S. Chen, H. C. Chen, F. W. Liao, Y. T. Lin, **P. H. Yeh***, C. Y. Lai and C. L. Chang," Thermoelectric

property and x-ray absorption near edge structure studies on Si-doped CaMnO3−δ", Ceramics International, **42**, 4048-4053, (2016). (IF:2.758, ▲:2).

6. L. C. Kao, S. Y. H. Liou, C. L. Dong, **P. H. Yeh*** and C. L. Chen," Tandem Structure of QD Cosensitized TiO_2 Nanorod Arrays for Solar Light Driven Hydrogen Generation", ACS Sustainable Chemistry & Engineering, **4**, 210-218, (2016). (IF:5.267, ▲:5).

7. W. C. Wang, C. Y. Lai, Y. T. Lin, T. H. Yua, Z. Y. Chen, W. W. Wu and **P. H. Yeh***," Surface defect engineering: gigantic enhancement in the optical and gas detection ability of metal oxide sensor", RSC Advances, **6**, 65146-65151, (2016). (IF:3.289, ▲:1).

8. A. Mohanta, S. F. Wang, T. F. Young, **P. H. Yeh***, D. C. Ling, M. E. Lee and D. J. Jang," Observation of weak carrier localization in green emitting InGaN/GaN multi-quantum well structure", Journal of Applied Physics, **117**, 144503, (2015). (IF:2.101, ▲:3).

9. C. H. Sung, T. C. Chien, C. M. Chang, C. M. Chang and **P. H. Yeh***," A nanopoint Schottky-gate array device: surface defect application and molecular detection", RSC Advances, **5**, 16769-16773, (2015). (IF:3.829, ▲:2).

10. J. M. Chiu, L. Y. Lin, **P. H. Yeh***, C. Y. Lai, K. Teng, C. C. Tu, S. S. Yang and

J. F. Yu," Synthesizing highly conductive cobalt sulfide hydrangea macrophylla using long carbon-chain sulfur source for supercapacitors", RSC Advances, **5**, 83383-83390, (2015). (IF:3.829, ▲:4).

11. H. W. Chang, Y. R. Lu, J. L. Chen, C. L. Chen, J. F. Lee, J. M. Chen, Y. C. Tsai, C. M. Chang, **P. H. Yeh***, W. C. Chou, Y. H. Liou and C. L. Dong," Nanoflaky MnO_2/functionalized carbon nanotubes for supercapacitors: an in situ X-ray absorption spectroscopic investigation", Nanoscale, **7**, 1725-1735, (2015). (IF:7.760, ▲:15).

12. C. M. Chang, C. H. Hsu, Y. W. Liu, T. C. Chien, C. H. Sung and **P. H. Yeh***," Interface engineering: broadband light and low temperature gas detection abilities using a nano-heterojunction device", Nanoscale, **7**, 20126-20131, (2015). (IF:7.760, ▲:1).

13. C. Y. Lai, T. C. Chien, T. Y. Lin, T. Ke, S. H. Hsu, Y. J. Lee, C. Y. Su, J. T. Sheu and **P. H. Yeh***" Intensify the application of ZnO-based nanodevices in humid environment: O_2/H_2 plasma suppressed the spontaneous reaction of amorphous ZnO nanowires", Nanoscale Research Letters, **9**, 1-5, (2014). (IF:2.779, ▲:5).

14. Y. T. Chang, J. Y. Chen, T. P. Yang, C. W. Huang, C. H. Chiu, **P. H. Yeh*** and W. W. Wu," Excellent piezoelectric and electrical properties of lithium-doped

ZnO nanowires for nanogenerator applications", Nano Energy, **8**, 291-296, (2014). (IF:10.325, ▲:18).

15. W. L. Chiu, C. H. Chiu, J. Y. Chen, C. W. Huang, Y. T. Huang, K. C. Lu, C. L. Hsin, **P. H. Yeh*** and W. W. Wu," Single-crystalline δ-Ni_2Si nanowires with excellent physical properties", Nanoscale Research Letters, **8**, 1-5, (2013). (IF:2.481, ▲:9).

16. R. J. Chung, H. Y. Wang, Y. C. Li and **P. H. Yeh***," Preparation and Sensor Application of Carbon Coated Zinc Oxide Nanorods Array", Journal of The Australian Ceramic Society, **49 (2)**, 81-88, (2013). (IF:0.338, ▲:5).

17. J. K. Hsu, T. Y. Lin, C. Y. Lai, T. C. Chien, J. H. Song and **P. H. Yeh***," Tunable Schottky barrier height and surface potential by using hydrogen ions", Applied Physics Letters, **103**, 123507, (2013). (IF:3.515, ▲:5).

18. C. Y. Kao, C. L. Hsin, C. W. Huang, S. Y. Yu, C. W. Wang, **P. H. Yeh*** and W. W. Wu," High-yield synthesis of ZnO nanowire arrays and their opto-electrical properties", Nanoscale, **4**, 1476-1480, (2012). (IF:6.233, ▲:23).

19. F. H. Chu, C. W. Huang, C. L. Hsin, C. W. Wang, S. Y. Yu, **P. H. Yeh*** and W. W. Wu," Well-aligned ZnO nanowires with excellent field emission and photocatalytic properties", Nanoscale, **4**, 1471-1475, (2012). (IF:6.233, ▲:80).

20. C. C. Lai, Y. J. Lee, **P. H. Yeh*** and S. W. Lee," Formation mechanism of SiGe nanorod arrays by combining nanosphere lithography and Au-assisted chemical etching", Nanoscale Research Letters, **7**, 1-6, (2012). (IF:2.524, ▲:6).

Interface and Defect Engineering: Broadband Light and Low Temperature Gas Detection Abilities by Using Nano-Heterojunction Device

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Abstract

Recently, broadband light detection (from 365~940 nm) and low operating temperature (50 ℃) gas detection abilities can be achieved by using the nano-heterojunction. The broadband light detection mechanism is based on the defects and the band bending between the heterojunction interface. Furthermore, the nano-heterojunction of the nano-device has local Joule-heating effect to enhance the gas detection ability. The reset time and sensitivity of nano-heterojunction device are an order faster and larger than the Schottky-contacted devices (previous works); it is due to the local Joule-heating effect between the interface of nano-heterojunction. Based on above idea, we can design widespread used and diversification nano-device.

Keywords: interface defect, UV-visible light detection, low temperature gas detection, nano-heterojunction