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EDUCATION

National Taiwan University , Taipei, Taiwan <i>Ph.D. in Physics</i>	2007 - 2011
National Taiwan Normal University , Taipei, Taiwan <i>Bachelor of Science in Physics</i>	2002 - 2006

PROFESSIONAL EXPERIENCE

Khalifa University , Abu Dhabi, United Arab Emirates <i>Postdoctoral Research Fellow</i>	2018 - present
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I start to participate in the research activities in the MI-MIT flagship project: High efficiency, lightweight, radiation-resistant space solar cells enabled by 2D material-based layer transfer (2DLT). The main activity I am leading in the project is to investigate the surface energy of graphene-coated substrates, which could be the key to have a successful epitaxy growth of III-V semiconductor on graphene-coated III-V semiconductor substrate. By combining the micro-Raman spectroscopy, atomic force microscopy, Fourier-transform infrared spectroscopy, and theoretical quantum physics simulation, we demonstrate a new route to nondestructively monitor the interface between graphene and coated substrates, which has potential applications in the fields of electronic devices, energy conversion, and storage. Two representative works have been published in Physical Chemistry Chemical Physics and Nanoscale, respectively.

In addition, I also extend my interest from graphite/graphene to other 2D materials, such as InSe, and SnS, owing to their unique electronic and optical properties suitable for applications in downscaling of electronic devices. In the combination of density functional theory simulation with experimental characterization, we have conducted two works on exploring electronic and optical properties of GeS and InSe thin flakes:

1. High-Temperature Defect-Induced Hopping Conduction in Multilayered Germanium Sulfide for Optoelectronic Applications in Harsh Environments, published in ACS Applied Nano Materials.
2. Thickness-Dependent Resonant Raman and E' Photoluminescence Spectra of Indium Selenide and Indium Selenide/Graphene Heterostructures, published in The Journal of Physical Chemistry C.

Masdar Institute of Science and Technology , Abu Dhabi, United Arab Emirates <i>Postdoctoral Research Fellow</i>	2016 - 2017
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I was involved in an external project: Impact of Pore-scale Wettability Changes on Three-Phase Relative Permeability Characterization in Carbonate Reservoirs funded by ADNOC, which is one of the largest national Oil and Gas Company in the Gulf region. My research effort was mainly on building a methodology to directly predict the calcite surface wettability with first-principles quantum simulation, which has been published in the Journal of Physical Chemistry letter and Journal of Physical Chemistry C, respectively. These researches have been reported in the Emirates news.

Masdar Institute of Science and Technology , Abu Dhabi, United Arab Emirates <i>Postdoctoral Research Fellow</i>	2015 - 2016
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I joined Masdar Institute of science and technology, and I was involved in the MI-MIT flagship project: High-Performance Compact Solar Thermal Power and Cooling Systems, in collaboration between Masdar Institute (UAE) and Massachusetts Institute of Technology (USA). My research efforts are mainly

on the design and fabrication of advanced solar plasmonic absorbers to maximize solar efficiency by increasing solar absorption while maintaining low thermal emittance. Two representative works have been published in Advanced Optical Materials,

1. Plasmonic solar absorbers: design and simulation of ultrathin film nanoporous absorbers to improve the visible light absorption. The paper has been published in Advanced Optical Materials. This research has been reported in the MIT news.
2. Plasmonic nanocomposite absorbers with self-formed topping nanoparticles: Design of ultrathin film nanocomposite absorbers to improve the light absorption in the wide solar spectra. The paper has been published in Advanced Optical Materials. This research has been reported in the UAE National news.

Taiwan Semiconductor Manufacturing Company, Hsinchu, Taiwan

2012 - 2014

Principal Integration Engineer

I was working as a process integration engineer. The contents of my job are to control the inline process, including lithography, etch, physical vapor deposition, and chemical vapor deposition, and all other cleanroom fabrications. Meanwhile, coordinate with several departments to solve issues and improve production recipes for yield enhancement. The major achievement is the development and vilification of a new process flow for the N28 CMOS image sensor in collaboration with an external Japanese company.

National Taiwan University, Taipei, Taiwan

2007 - 2011

Ph.D. student

During my Ph.D. career, I start with chemical vapor deposition of zinc oxide nanowires as my first scientific study, and then I was fascinated by the power of finite difference time domain method simulation. My research efforts are mainly in the development of an efficient dielectric function into the optical simulation for a description of the optical properties of materials, which was implemented into free optical simulation software. Meanwhile, I was also one of the contributors in constructing geometries of discrete-dipole approximation ADDA: a free light scattering software code in its beginning stage. When I was graduated, I got a GPA:4.3/4.3 and received the Dean's award in Physics.

EXPERTISE

Optical computation	FDTD, RCWA, DDA
Density functional theory	QuantumEspresso, Quantumwise
Thin-film depositions	CVD, sputtering, thermal
CMOS fabrication technology	28 nm
Analytical technique	electron microscopy, Raman, UV-Vis, Filmetric optical spectroscopy
Programming Languages	Fortran, C, Python, OpenMP, MPI, CUDA

PUBLICATION

Journal Papers

1. B. Alfakes, J.E. Villegas, H. Apostoleris, R.S. Devarapalli, S.R. Tamalampudi, **J.Y. Lu**, J. Viegas, I. Almansouri, and M. Chiesa, "Optoelectronic Tunability of Hf Doped ZnO for Photovoltaic Applications," *Journal of Physical Chemistry C*, 123(24), 15258-15266, 2019.
2. A. Al-Hagri, R. Li, N.S. Rajput, **J.Y. Lu**, S. C., K. Sloyan, M.A. Almahri, S.R. Tamalampudi, M. Chiesa, and A.A. Ghaferi, "Direct growth of single-layer terminated vertical graphene array on germanium by plasma-enhanced chemical vapor deposition," *Carbon*, 155, 320-325, 2019.
3. **J.Y. Lu**, Q. Ge, A. Raza, and T.J. Zhang, "Quantum Mechanical Prediction of Wettability of Multiphase Fluids-Solid Systems at Elevated Temperature," *Journal of Physical Chemistry C*, 123(20), 12753-12761, 2019.

4. S.R. Tamalampudi, R. Sankar, H. Apostoleris, M.A. AlMahri, B. Alfakes, A. Al-Hagri, R. Li, A. Gougam, I. Almansouri, M. Chiesa, and **J.Y. Lu**, "Thickness-Dependent Resonant Raman and E' Photoluminescence Spectra of Indium Selenide and Indium Selenide/Graphene Heterostructures," *Journal of Physical Chemistry C*, 123(24), 15345-15353, 2019.
5. Md. M. Rahman, A. Raza, H. Younes, A. AlGhaferi, M. Chiesa, and **J.Y. Lu**, "Hybrid graphene metasurface for near-infrared absorbers," *Optics Express*, 27(18), 24866-24876, 2019.
6. S.R. Tamalampudi, S. Patole, B. Alfakes, R. Sankar, I. Almansouri, M. Chiesa, and **J.Y. Lu**, "High-Temperature Defect-Induced Hopping Conduction in Multi-Layered Germanium Sulfide for Optoelectronics Applications in Harsh Environments," *ACS Applied Nano Materials*, 2(4), 2169-2175, 2019.
7. **J.Y. Lu**, T.A. Olukan, S.R. Tamalampudi, A. Al-Hagri, C.Y. Lai, M.A. Almahri, H. Apostoleris, I. Almansouri, and M. Chiesa, "Insights into Graphene Wettability Transparency by Locally Probing its Surface Free Energy," *Nanoscale*, 11, 7944-7951, 2019.
8. Afra S. Alketbi, B. Yang, A. Raza, M. Zhang, **J.Y. Lu**, Z. Wang, and T.J. Zhang, "Sputtered SiC coatings for radiative cooling and light absorption," *Journal of Photonics for Energy*, 9(3), 032703, 2018.
9. K. Sloyan, C.Y. Lai, **J.Y. Lu**, B. Alfakes, S.A. Hassan, I. Almansouri, M.S. Dahlem, and M. Chiesa, "Discerning the Contribution of Morphology and Chemistry in Wettability Studies," *The Journal of Physical Chemistry A*, 122(38), 77687773, 2018.
10. Y.-C. Chiou, T.A. Olukan, M.A. Almahri, H. Apostoleris, C.-H. Chiu, C.Y. Lai, **J.Y. Lu**, S. Santos, I. Almansouri, and M. Chiesa, "Direct Measurement of the Magnitude of the van der Waals Interaction of Single and Multilayer Graphene," *Langmuir*, 34(41), 1233512343, 2018.
11. **J.Y. Lu**, C.Y. Lai, I. Almansour, and M. Chiesa, "The evolution in graphitic surface wettability with first-principles quantum simulations: the counterintuitive role of water," *Physical Chemistry Chemical Physics*, 20, 22636-22644, 2018.
12. X.Q. Li, J.L. Li, **J.Y. Lu**, N. Xu, C.L. Chen, X.Z. Min, B. Zhu, H.X. Li, L. Zhou, S.N. Zhu, T.J. Zhang, and J. Zhu, "Enhancement of Interfacial Solar Vapor Generation by Environmental Energy," *Joule*, 2(7), 1331-1338, 2018.
13. A. Raza, **J.Y. Lu**, S. Alzaim, H. Li, and T.J. Zhang, "Novel Receiver-Enhanced Solar Vapor Generation: Review and Perspectives," *Energies*, 11(1), 253, 2018. (Invited review)
14. **J.Y. Lu**, Q. Ge, H. Li, A. Raza, and T.J. Zhang, "Direct Prediction of Calcite Surface Wettability with First-Principles Quantum Simulation," *Journal of Physical Chemistry Letters*, 8, 53095316, 2017.
15. **J.Y. Lu**, A. Raza, S. Noorulla, Afra S. Alketbi, N.X. Fang, G. Chen, and T.J. Zhang, "Near-Perfect Ultra-thin Nanocomposite Absorber with Self-Formed Topping Plasmonic Nanoparticles," *Advanced Optical Materials*, 5, 1700222, 2017.
16. **J.Y. Lu**, A. Raza, N.X. Fang, G. Chen, and T.J. Zhang, "Effective dielectric constants and spectral density analysis of plasmonic nanocomposites," *Journal of Applied Physics*, 120(16), 163103, 2016.
17. Md. M. Rahman, H. Younes, **J.Y. Lu**, G.W. Ni, S.J. Yuan, N.X. Fang, T.J. Zhang, and A. AlGhaferi, "Broadband Light Absorption by Silver Nanoparticles Decorated Silica Nanospheres," *RSC Advance*, 6, 107951-107959, 2016.
18. **J.Y. Lu**, S.H. Nam, K. Wilke, A. Raza, Y.K. Lee, A.A. Ghaferi, N.X. Fang, and T.J. Zhang, "Localized Surface Plasmon Enhanced Ultrathin Film Broad-Band Nanoporous Absorbers," *Advanced Optical Materials*, 4(8), 1255-1264, 2016.
19. H.R. Liu, A. Raza, A. Aili, **J.Y. Lu**, A. AlGhaferi, and T.J. Zhang, "Sunlight-Sensitive Anti-Fouling Nanostructured TiO₂ coated Cu Meshes for Ultrafast Oily Water Treatment," *Scientific Reports*, 6, 25414, 2016.
20. Y.W. Lin, W.J. Chen, **J.Y. Lu**, Y.H. Chang, C.T. Liang, Y.F. Chen, and J.Y. Lu, "Growth and characterization of ZnO/ZnTe core/shell nanowire arrays on transparent conducting oxide glass substrates," *Nanoscale Research Letters*, 7:401, 2012.
21. **J.Y. Lu**, H.Y. Chao, J.C. Wu, S.Y. Wei, and Y.H. Chang, "Metallic-shell nanocylinder arrays for surface-enhanced spectroscopies," *Nanoscale Research Letters*, 6:173, 2011.

22. H.Y. Chao, S.H. You, **J.Y. Lu**, J.H. Cheng, Y.H. Chang, and C.T. Wu, "The growth and characterization of ZnO/ZnTe core-shell nanowires and the electrical properties of ZnO/ZnTe core-shell nanowires field-effect transistor," *Journal of Nanoscience and Nanotechnology*, 11(3), 2042-2046, 2011.
23. **J.Y. Lu** and Y.H. Chang, "The lightning mode in a core-shell nanocylinder dimer, Optics Communications," *Optics Communications*, 283(12), 2627-2630, 2010.
24. **J.Y. Lu**, H.Y. Chao, J.C. Wu, S.Y. Wei, Y.H. Chang, and S.C. Chen, "Retardation-induced plasmon modes in silica-core gold-shell nanocylinder pair," *Physica E*, 42, 2583-2587, 2010.
25. **J.Y. Lu** and Y.H. Chang, "Implementation of an efficient dielectric function into the finite difference time domain method for simulating the coupling between localized surface plasmons of nanostructures," *Superlattices and Microstructures*, 47(1), 60-65, 2010.
26. H.Y. Chao, J.H. Cheng, **J.Y. Lu**, Y.H. Chang, C.L. Cheng, Y.F. Chen, and C.T. Wu, "Growth and characterization of type-II ZnO/ZnTe core-shell nanowire arrays for solar cell applications," *Superlattices and Microstructures*, 47(1), 160-164, 2010.
27. **J.Y. Lu** and Y.H. Chang, "Optical singularities associated with the energy flow of two closely spaced core-shell nanocylinders, Optics Communications," *Optics Express*, 17(22), 19451-19458, 2009.

Conference Papers

1. **J.Y. Lu**, Md. M. Rahman, and M. Chiesa, "Amorphous Graphene-Based Plasmonic Metasurface for Near-Infrared Absorbers," *American Physical Society April*, April 16-19, 2019, Denver, USA.
2. **J.Y. Lu**, C.Y. Lai, M.A. Almahri, T. Olukan, H. Apostoleris, I. Almansouri, and M. Chiesa, "Prediction of Surface Wettability of Fresh and Aged Graphite Surfaces from First-Principles Density Functional Theory Simulations," *Material Research Society Fall*, November 25-30, 2018, USA.
3. **J.Y. Lu**, S. Noorulla, N.X. Fang, and T.J. Zhang, "Design of Broadband Ultrathin Film Nanoporous Solar Absorbers," *Micro/Nanoscale Heat & Mass Transfer International Conference*, January 1-4, 2016, Biopolis, Singapore.
4. **J.Y. Lu**, A. Raza, N.X. Fang, G. Chen, and T.J. Zhang, "Optical Characterizations of Plasmonic Nanocomposites," *The 8th Annual International Workshop on Advanced Materials*, February 21-23, 2016, Ras Al Khaimah, UAE.
5. S. Noorulla, **J.Y. Lu**, S.H. Nam, N.X. Fang, and T.J. Zhang, "Plasmon-Enhanced Solar Absorbers," *The 8th Annual International Workshop on Advanced Materials*, February 21-23, 2016, Ras Al Khaimah, UAE.
6. A. Alketbi, **J.Y. Lu**, and T.J. Zhang, "Design and Performance of Passive Radiative Cooler under Direct Sunlight," *The Graduate Students Research Conference*, March 20-22, 2016, Al Ain, UAE.
7. S. Noorulla, **J.Y. Lu**, A. Raza, and T.J. Zhang, "Near Perfect Broadband Absorber Based on Random Metal Nanoparticles with Varied Spacer layers," *The Graduate Students Research Conference*, March 20-22, 2016, Al Ain, UAE.
8. **J.Y. Lu**, D. Liu, K. Wilke, S. Noorulla, N.X. Fang, and T.J. Zhang, "Plasmon-Enhanced Ultrathin Film Broad-Band Nanoporous Absorber," *American Physics meeting (ASP)*, March 2-6, 2015, San Antonio, USA.
9. **J.Y. Lu**, and Y.H. Chang, ",," *14th International Conference on Modulated Semiconductor structures (MSS-14)*, 2011, Florida, USA.
10. **J.Y. Lu**, H.Y. Chou, J.C. Wu, S.Y. Wei, and Y.H. Chang, ",," *16th International Conference on Superlattices, Nanostructures and Nanodevices*, 2010, Beijing, China.
11. **J.Y. Lu** and Y.H. Chang, ",," *9th International Conference on Physics of Light-Matter Coupling in Nanostructures*, 2009, Lecce, Italy.

HONORS/AWARDS

1. Top 5 Papers, "Localized Surface Plasmon Enhanced Ultrathin Film Broadband Nanoporous Absorbers", *Advanced Optical Materials*, July 2016.

2. Best Paper Award, "Design and Performance of Passive Radiative Cooler under Direct Sunlight", UAE Graduate Students Research Conference (GSRC), May 2016.
3. Best Presentation Award, "Induction to fabrication flow induction to N28LP fabrication process", Department of fabrication Integration, TSMC, 2014.
4. Dean's Award, Department of Physics, National Taiwan University, 2011.

REFERENCES

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