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个人简介:

**LI JUNSHUAI:** PhD and Professor in electron devices physics. His present research interests mainly focus on design and fabrication of highly efficient and ultrathin film-based solar cells, and also on optical and electrical properties of semiconductor nanostructures, such as Si nanowire arrays. So far, he has authored and co-authored 2 book chapters, 1 invited review paper and more than 50 peer-reviewed papers on top-tiered international conferences and journals in the fields of electron devices and applied physics, such as IEEE International Electron Devices Meeting (IEDM). In the meantime, Prof Li also actively serves as a reviewer for a number of key international journals like Semiconductor Science and Technology (IOP), Applied Physics Letters (AIP), Journal of Applied Physics (AIP), Nanoscale (RSC), Journal of Experimental Nanoscience (Taylor & Francis), Journal of Physics D: Applied Physics (IOP), IEEE Transaction on Plasma Science, and Nanotechnology (IOP) etc.

研究方向:

1. Design and fabrication of nano surface textures applied for highly efficient and ultrathin film-based solar cells;
2. Optical and electrical properties of semiconductor nanostructures;
3. 3-D solar cells and other green electronic devices;
4. Plasma science & plasma-assisted materials synthesis;
5. Preparation and applications of graphene.

研究工作:

### Selected papers published since 2009:

#### Book Chapters:

1. Yali Li, Qiang Chen, Deyan He, and **Junshuai Li**<sup>‡</sup>, "Advanced Radial pn Junction Solar Cells Constructed on Silicon Nanowire Arrays", pp.359-392, Book chapter 14 in Volume 8 (Volume ISBN:1-62699-00805) titled "Electronics and Photovoltaics" in the 10-volume book set on NANOTECHNOLOGY (Series ISBN:1-62699-000-X) (Stadium Press LLC, USA, 2012).
2. **Junshuai Li** and HongYu Yu, "Enhancement of Si-based solar cell efficiency via nanostructure integration", pp. 3-55, **Book Chapter 1** in the book entitled "Energy Efficiency and Renewable Energy through Nanotechnology" edited by L. Zang (Springer, 2011), ISBN: 978-0-85729-637-5.

#### Journal Papers:

3. Qiang Chen<sup>‡</sup> and **Junshuai Li**<sup>‡</sup>, "Observation of positive self bias in a radio frequency atmospheric pressure microplasma", *IEEE Transactions on Plasma Science* (Accepted 2013).

4. **Junshuai Li**, HongYu Yu, and Yali Li, “Solar energy harnessing in hexagonally arranged Si nanowire arrays and effects of array symmetry on optical characteristics”, *Nanotechnology* **23**, 194010 (2012).
5. Xiaocheng Li, Beng Kang Tay, **Junshuai Li**, Dunlin Tan, Chong Wei Tan, and Kun Liang, “Mildly reduced graphene oxide-Ag nanoparticle hybrid films for surface-enhanced Raman scattering”, *Nanoscale Research Letters* **7**, 205 (2012).
6. **Junshuai Li**, HongYu Yu, and Yali Li “Aligned Si nanowire-based solar cells”, *Nanoscale* **3**, 4888 (2011). (**Top ten most-read articles in December, 2011**)
7. **Junshuai Li** and HongYu Yu, (**Invited review**) “Texturing of crystalline Si thin film solar cells via nanostructure to boost efficiency”, *International Journal of Nanoparticles* **4**, 284 (2011).
8. Li, Yali; Yu, HongYu; **Li, Junshuai**; Wong, She Mein; Sun, Xiao Wei; LI, Xianglin; Cheng, Chuanwei; Fan, Hong Jin; Lo, Guo-Qiang; Wang, Jian; Singh, Navab; Kwong, Dim-Lee, “Novel low aspect-ratio Si nano-hemisphere array surface texturing for solar cell applications”, *Small* **7**, 3138-3143 (2011).
9. **Junshuai Li**, HongYu Yu, Yali Li, Fei Wang, Mingfei Yang, and She Mein Wong, "Low aspect-ratio hemispherical nanopit array surface texturing for enhancing light absorption in crystalline Si thin film-based solar cells", *Applied Physics Letters* **98**, 021905-3 (2011).
10. **Junshuai Li**, HongYu Yu, She Mein Wong, Gang Zhang, Guo-Qiang Lo, and Dim-Lee Kwong, “Si nanocone array optimization on Si thin films for solar energy harvesting”, *Journal of Physics D: Applied Physics* **43**, 255101-7 (2010).
11. **Junshuai Li**, HongYu Yu, She Mein Wong, Xiaocheng Li, Gang Zhang, Patrick Guo-Qiang Lo, and Dim-Lee Kwong, “Design guidelines of periodic Si nanowire arrays for solar cell application”, *Applied Physics Letters* **95**, 243113-3 (2009).
12. **Junshuai Li**, HongYu Yu, She Mein Wong, Gang Zhang, Xiaowei Sun, Guo-Qiang Lo, and Dim-Lee Kwong, “Si nanopillar array optimization on Si thin films for solar energy harvesting”, *Applied physics Letters* **95**, 033102-3 (2009). [Also selected for publication on *Virtual Journal of Nanoscale Science & Technology*, August 3, 2009.]
13. Yali Li, Chunyang Li, Deyan He, and **Junshuai Li**<sup>‡</sup>, “Indium tin oxide films prepared by atmospheric plasma annealing and their semiconductor-metal conductivity transition around room temperature”, *Journal of Physics D: Applied Physics* **42**, 105303-5 (2009).
14. **Junshuai Li**, Jinxiao Wang, Min Yin, Pingqi Gao, Deyan He, Qiang Chen, and Yali Li, “Deposition of controllable preferred orientation silicon films on glass by inductively coupled plasma chemical vapour deposition”, *Journal of Applied Physics* **103**, 043505-7 (2008).
15. **Junshuai Li**, Jinxiao Wang, Min Yin, Pingqi Gao, Yali Li, and Deyan He, “Highly-crystallized silicon films grown on glass without amorphous incubation layers by inductively coupled plasma chemical vapor deposition”, *Journal of Crystal Growth* **310**, 4340-4344 (2008).
16. Wong, She Mein; Yu, HongYu; Li, Yali; **Li, Junshuai**; Sun, Xiao Wei; Wang, Fei; Yang, MingFei; Singh, Navab; Lo, Guo-Qiang; Kwong, Dim-Lee, “Boosting Short-Circuit Current With Rationally Designed Periodic Si Nanopillar Surface Texturing for Solar Cells”, *IEEE Transactions on Electron Devices* **58**, 3224-3229 (2011).
17. M. Yang, X. W. Sun, H. Y. Yu, **Junshuai Li**, and J. H. Hu, “Low temperature polycrystalline silicon film formation by metal induced crystallization with nickel salt derived by ultrasonic spray pyrolysis”, *Crystal Research and Technology*, **46**, 935 (2011).

发表论文:

18. F. Wang, H.Y. Yu, **Junshuai Li**, S.M. Wong, X.W. Sun, and X.C. Wang, "Design guideline of high efficiency crystalline Si thin film solar cell with nanohole array textured surface", *Journal of Applied Physics* **109**, 084306 (2011).
19. S.M. Wong, H.Y. Yu, **Junshuai Li**, Y.L. Li, N. Singh, Patrick G.Q. Lo, and D.L. Kwong, "Si nanopillar array surface texture for thin film solar cell with radial  $p$ - $n$  junction", *IEEE Electron Device Letters* **32**, 176-178 (2011).
20. M. Yang, H. Yu, X. Sun, **Junshuai Li**, X. Li, L. Ke, J. Hu, F. Wang, and Z. Jiao, "Periodic silicon nanocones arrays with controllable dimensions prepared by a novel and cost-effective method using  $\text{NH}_4\text{OH}/\text{H}_2\text{O}_2$  solution", *Solid State Communications* **151**, 127-129 (2011).
21. X. Li, **Junshuai Li**, Ting Chen, Beng Kang Tay, Jianxiong Wang, and HongYu Yu, , "Periodically aligned Si nanopillar arrays as efficient antireflection layers for solar cell applications", *Nanoscale Research Letters* **5**, 1721-1726 (2010).
22. F. Wang, H.Y. Yu, X. Wang, **Junshuai Li**, X. Sun, M. Yang, S.M. Wong, and H. Zheng, "Maskless fabrication of large scale Si nanohole array via laser annealed metal nanoparticles catalytic etching for photovoltaic application", *Journal of Applied Physics* **108**, 024301 (2010).
23. S.M. Wong, H.Y. Yu, **Junshuai Li**, Gang Zhang, Patrick Guo-Qiang Lo, and Dim-Lee Kwong, "Design high efficiency Si nanopillar array textured thin film solar cell", *IEEE Electron Device Letters* **31**, 335-337 (2010).
24. F. Wang, H.Y. Yu, **Junshuai Li**, X. Sun, X. Wang, and H. Zheng, "Optical absorption enhancement in nanopore textured silicon thin film for photovoltaic application", *Optics Letters* **35**, 40-42 (2010).
25. Q. Chen, **Junshuai Li**, K. Saito, and H. Shirai, "The characterization of radio-frequency discharge using electrolyte solution as one electrode at atmospheric pressure", *Journal of Physics D: Applied Physics* **41**, 175212-6 (2008).

#### Conference Papers:

26. **Junshuai Li**, HongYu Yu, and Yali Li, "Optical simulation of low aspect ratio hemisphere array surface texturing for crystalline Si film solar cells", *1<sup>st</sup> International Conference on Silicon Photovoltaics*, April 2011, Freiburg, Germany. [Full paper published on *Energy Procedia* **8**, 180 (2011)]
27. **Junshuai Li**, She Mein Wong, Yali Li, and HongYu Yu, "High-efficiency crystalline Si thin film solar cells with Si nanopillar array textured surfaces", *35<sup>th</sup> IEEE Photovoltaic Specialists Conference*, pp. 1469-1473, Jun. 2010, Hawaii, U.S.A.
28. **Junshuai Li**, HongYu Yu, She Mein Wong, Gang Zhang, Guo-Qiang Lo, and Dim-Lee Kwong, "Surface nanostructure optimization for solar energy harvesting in Si thin film based solar cells", *IEEE International Electron Devices Meeting (IEDM)-2009* pp.547-550, Dec. 2009, Baltimore, U.S.A.

#### News report & Research highlights :

1. Light-harvesting boosted by 'forests' of nanostructures on thin silicon films:  
<http://www.nano.org.uk/news/486/>;
2. Solar cells: An optimal harvest: <http://www.research.a-star.edu.sg/research/6132/>;
3. Growing 'forests' of nanostructures on thin silicon films boosts their light-harvesting properties:  
<http://www.nanowerk.com/news/newsid=15579.php>;

