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Personal Information

Date of Birth: 20th December 1978

Marital Status: Married

Education and Experience

- Ph. D.: Materials Science and Engineering, POSTECH, Pohang, Republic of Korea
(September 2004—August 2010, GPA 3.89/4.3)
*Advisor: Prof. Jong Heo (POSTECH), Prof. Gyu-Chul Yi (present affiliation: Seoul National University)
-Dissertation title: “ZnO nanorod heterostructures for light emitting device applications”
- Researcher: Materials Science and Engineering, POSTECH, Pohang, Republic of Korea
(March 2003—August 2004)
- Bachelor of Science: Materials Science and Engineering, POSTECH, Pohang, Republic of Korea (March 1997—February 2003)
* The Top Grade Student in Department of Materials Science and Engineering (Magna cum Laude, GPA 3.69/4.3)
* Military service: Jan. 2000 — Mar. 2002

Research Interest

- Growth and characterization of semiconductor nanowires and nanowire heterostructures including quantum structures (e.g. Si, Ge, GaN, ZnO) including position-controlled growth and density-controlled growth
- Fabrication of nanostructure-based LEDs and photovoltaic cells using nanowire heterostructure arrays
- Doping in semiconductor: n-type doping, p-type doping, Modulation doping
- Development of growth system for doping and alloying
- Optical characterizations of semiconductor nanorod heterostructures including single nanorod characterization
- Electrical characterizations of semiconductor nanorod heterostructures including single nanorod characterization

Awards and Fellowship

1. Awardee of Postdoctoral fellowship supported by Korea government (September 2010 ~ August 2011)
2. Best Poster Award: 2008 Korean Physical Society Fall Meeting
3. Outstanding Presentation Award: Joint Symposium on Materials Science and Engineering for the 21st Century (Republic of China, 2007)
4. Outstanding Poster Award: 2006 Materials Research Society Spring Meeting
5. Best Poster Award: 2005 Korean Physical Society Fall Meeting
6. Undergraduate scholarship supported by POSTECH (1997–2002)

Research Project

- 1) EERE-DOE
- 2) National Creative Research Initiative Center for Semiconductor Nanorods supported by National Research Foundation of Korea
- 3) The National Program for Nanostructured Materials Technology supported by Ministry of Science and Technology as one of the 21st Century Frontier Programs

Teaching Experience

<Teaching assistant in Dept. of Materials Science and Engineering, POSTECH>

March 2005–June 2005 “Electronic and optical properties of materials” –Undergraduate

student

March 2006–June 2006 “Electronic and optical properties of materials” –Undergraduate student

Technical Skills

Growth

- 1) Metal-organic chemical vapor deposition (MOCVD)
- 2) Sputtering

Materials Characterizations

- 1) Morphological and Structural characterizations: SEM, FE-SEM, TEM, AFM, Synchrotron-radiation XRD, Synchrotron-radiation EXAFS
- 2) Optical characterizations: PL, micro-PL, Raman, CL
- 3) Electrical characterizations: Photovoltaic characterization, EL, micro-EL, Hall measurement (at room temperature and low temperature), Field-Effect Transistor characterizations
- 4) Miscellaneous: ICP-Mass Spectrometry, XPS, UPS

Semiconductor Processing

- 1) E-beam lithography
- 2) Photolithography
- 3) Etching: Wet etching, Reactive ion etching
- 4) Rapid Thermal Annealing
- 5) Metal deposition: *e*-beam evaporation, thermal evaporation

Professional Activity

Member of Materials Research Society

Member of Korean Physical Society

List of Publications

1. “GaN/ZnO Nanotube Heterostructure Light-Emitting Diodes Fabricated on Si”, Chul-Ho Lee, Young Joon Hong, Yong-Jin Kim, Jinkyung Yoo, Hyeonjun Baek, Seong-Ran Jeon, Seung-Jae Lee, and Gyu-Chul Yi, IEEE J. Sel. Topics in Quant. Electron. (Accepted)

2. "Modulation doping in ZnO nanorod for nanoelectronic device applications", J. Yoo, C.-H. Lee, Y.-J. Doh, H. S. Jung, and G.-C. Yi, Appl. Phys. Lett. 94(22), 223117 (2009)
3. "GaN/GaN/In_{1-x}Ga_xN/GaN/ZnO nanoarchitecture light emitting diode microarrays", C.-H. Lee, J. Yoo, Y. J. Hong, Y.-J. Kim, J. Cho, G.-C. Yi, S. R. Jeon, and J. H. Baek, Appl. Phys. Lett. 94(21), 213101 (2009)
4. "Fabrication and optical characteristics of position-controlled ZnO nanotubes and ZnO/ZnMgO coaxial nanotube quantum structure arrays", J. Yoo, Y. J. Hong, H. S. Jeong, Y.-J. Kim, C.-H. Lee, J. Cho, Y.-J. Doh, L. S. Dang, K. H. Park, G.-C. Yi, Adv. Funct. Mater. 19(10), 601 (2009)
5. "Nanophotonic energy up conversion using ZnO nanorod double-quantum-well structures", T. Yatsui, S. Sangu, K. Kobayashi, T. Kawazoe, M. Ohtsu, J. Yoo, and G.-C. Yi, Appl. Phys. Lett. 94(8), 083113 (2009)
6. "Controlled epitaxial growth modes of ZnO nanostructures using different substrate crystal planes", Y. J. Hong, J. Yoo, Y.-J. Doh, T.-W. Kim, K. Kong, M. Kim, D. R. Lee, K. H. Oh, G.-C. Yi, J. Mater. Chem. 19(7), 941 (2009)
7. "ZnO/Mg_{0.2}Zn_{0.8}O coaxial nanorod heterostructures for high-performance electronic nanodevice applications", Chul-Ho Lee, Jinkyong Yoo, Yong-Joo Doh, and Gyu-Chul Yi, Appl. Phys. Lett. 94(2), 043504 (2009)
8. "Shape-controlled Nanoarchitectures Using Nanowalls", Young Joon Hong, Hye Seong Jung, Jinkyong Yoo, Yong-Jin Kim, Chul-Ho Lee, Miyoung Kim and Gyu-Chul Yi, Adv. Mater. 21(1), 222 (2009)
9. "Surface morphology and growth mechanism of catalyst-free ZnO and Mg_xZn_{1-x}O nanorods", Miyoung Kim, Young Joon Hong, Jinkyong Yoo, Gyu-Chul Yi, Gyeong-Su Park, Ki-jeong Kong, Hyunju Chang, Phys. Status Solidi - Rapid Research Letters 2(5), 197 (2008)
10. "Position-controlled ZnO nanoflower arrays grown on glass substrates for electron emitter application", Yong-Jin Kim, Jinkyong Yoo, Byoung-Hwa Kwon, Young Joon Hong, Chul-Ho Lee, Gyu-Chul Yi, Nanotechnology 19(31), 315202(2008)
11. "Photoluminescent characteristics of Mg_xZn_{1-x}O (0 ≤ x ≤ 0.18) nanorods", Jinkyong Yoo, Young Joon Hong, Gyu-Chul Yi, Bonghwan Chon, Taiha Joo, Semicond. Sci. Technol. 23(9), 095015(2008)
12. "Local Structural Properties of ZnO Nanoparticles, Nanorods and Powder Studied by Extended X-ray Absorption Fine Structure", E.-S. Jeong, H.-J. Yu, S.-W. Han, Sung Jin

- An, Jinkyong Yoo, Y.-J. Kim and Gyu-Chul Yi, J. Korean Phys. Soc. 53(1) 461 (2008)
13. "Two-dimensional correlation analysis of the time-resolved photoluminescence spectra of gallium nitride nanowires", Bonghwan Chon, Soo Ryeon Ryu, Young-Joon Hong, Jinkyong Yoo, Gyu-Chul Yi, Taiha Joo a, Young Mee Jung, J. Molecular Structure 883, 209 (2008)
 14. "Probing Exciton Diffusion in Semiconductors Using Semiconductor-Nanorod Quantum Structures", Jinkyong Yoo, Gyu-Chul Yi, and Le Si Dang, Small 2008 4(4), 467 (2008)
 15. "Nanophotonic switch using ZnO nanorod double-quantum-well structures", Takashi Yatsui, Suguru Sangu, Tadashi Kawazoe, Motoichi Ohtsu, Sung Jin An, Jinkyong Yoo, and Gyu-Chul Yi, Appl. Phys. Lett. 90 (22), 223110 (2007)
 16. "Cathodoluminescence of single ZnO nanorod heterostructures", Bernard Piechal, Jinkyong Yoo, Abdelhamid Elshaer, Augustine Che Mofor, Gyu-Chul Yi, Andrey Bakin, Andreas Waag, Fabrice Donatini, and Le Si Dang, Phys. status solidi (b) 244(5), 1458 (2007)
 17. "Enhanced field emission properties from well-aligned zinc oxide nanoneedles grown on the Au/Ti/n-Si substrate", Chan Jun Park, Duck-Kyun Choi, Jinkyong Yoo, Gyu-Chul Yi, and Cheol Jin Lee, Appl. Phys. Lett. 90 (8), 083107 (2007)
 18. "Secondary electron emission properties of III-nitride/ZnO coaxial hetero structures under ion and X-ray bombardment", M. Cholewa, H. Moser, L. Huang, S. P. Lau, J. Yoo, S. J. An, G.-C. Yi, X. Y. Gao, A. T. S. Wee, A. Bettiol, F. Watt, B. Fischer, Nuclear Instruments & Methods in Physics Research section B 254 (1), 55 (2007)
 19. "Fabrication and photoluminescent characteristics of ZnO/Mg_{0.2}Zn_{0.8}O coaxial nanorod single quantum well structures", Jun Young Bae, Jinkyong Yoo and Gyu-Chul Yi, Appl. Phys. Lett. 89 (17), 173114 (2006)
 20. "Evaluating the Quantum Confinement Effect of Isolated ZnONanorod Single-Quantum-Well Structures Using Near-Field Ultraviolet Photoluminescence Spectroscopy", Takashi Yatsui , Motoich Ohtsu, Sung Jin An, Jinkyong Yoo and Gyu-Chul Yi, Opt. Rev. 13(4) 218 (2006)
 21. "Photoluminescent characteristics of Ni-catalyzed GaN nanowires", Jinkyong Yoo, Young Joon Hong, Sung Jin An, Gyu-Chul Yi, Bonghwan Cheon, Taiha Joo, Jong-wook Kim, and Jeong-Su Lee, Appl. Phys. Lett. 89 (4), 043124 (2006)
 22. "Enhanced secondary electron emission from group III nitride/ZnO coaxial nanorod

- heterostructures”, Shu Ping Lau, Lei Huang, Siu Fung Yu, Huiying Yang, Jin Kyoung Yoo, Sung Jin An, and Gyu-Chul Yi, *Small* 2 (6), 736 (2006)
23. “Local structure around Ga in ultrafine GaN/ZnO coaxial nanorod heterostructures”, S. W. Han, H. J. Yoo, S. J. An, J. Yoo, G.-C. Yi, *Appl. Phys. Lett.* 88 (11), 111910 (2006)
 24. “Optical properties of ZnO nanorods and nanowires”, A. Mézy, S. Anceau, T. Bretagnon, P. Lefebvre, T. Taliercio, Gyu-Chul Yi, and Jinkyong Yoo, *Superlattice and Microstructures* 39, 358 (2006)
 25. “Fabrication and Photoluminescent Properties of Heteroepitaxial ZnO/Zn_{0.8}Mg_{0.2}O Coaxial Nanorod Heterostructures”, Won Il Park, Jinkyong Yoo, Dong-Wook Kim, and Gyu-Chul Yi, *J. Phys. Chem. B* 110, 1516 (2006)
 26. “Quantum confinement effect in ZnO/Mg_{0.2}Zn_{0.8}O multishell nanorod heterostructures”, Eue-Soon Jang, Jun Young Bae, Jinkyong Yoo, Won Il Park, Dong-Wook Kim, and Gyu-Chul Yi, *Appl. Phys. Lett.* 88(2), 023102 (2006)
 27. “Electrical and optical characteristics of hydrogen plasma treated ZnO nanoneedle arrays”, Jinkyong Yoo, Won Il Park, and Gyu-Chul Yi, *J. Vac. Sci. Technol. B*, 23(5), 1970 (2005)
 28. “Near-field measurement of spectral anisotropy and optical absorption of isolated ZnO nanorod single-quantum-well structures”, Takashi Yatsui and Motoichi Ohtsu, Jinkyong Yoo, Sung Jin An, and Gyu-Chul Yi, *Appl. Phys. Lett.* 87, 033101 (2005)
 29. “Optical and Field Emission Properties of Thin Single-Crystalline GaN Nanowires”, Byeongchul Ha, Sung Ho Seo, Jung Hee Cho, Chong S. Yoon, Jinkyong Yoo, Gyu-Chul Yi, Chong Yun Park, and Cheol Jin Lee, *J. Phys. Chem. B* 109, 11095 (2005)
 30. “Catalyst-Free Metalorganic Chemical-Vapor Deposition of Ultrafine ZnO Nanorods”, Won Il Park, Jinkyong Yoo and Gyu-Chul Yi, *J. Korean Phys. Soc.* 46(5), L1067 (2005)
 31. “Synthesis of Single-Crystal CdS Microbelts Using a Modified Thermal Evaporation Method and Their Photoluminescence”, Guozhen Shen, Jung Hee Cho, Jin Kyoung Yoo, Gyu-Chul Yi, and Cheol Jin Lee, *J. Phys. Chem. B*, 109, 9294 (2005)
 32. “Synthesis and Optical Properties of S-Doped ZnO Nanostructures: Nanonails and Nanowires”, Guozhen Shen, Jung Hee Cho, Jin Kyoung Yoo, Gyu-Chul Yi, and Cheol Jin Lee, *J. Phys. Chem. B* 109, 5491 (2005)
 33. “Orientation-dependent x-ray absorption fine structure of ZnO nanorods”, S.-W. Han and H.-J. Yoo, Sung Jin An, Jinkyong Yoo, and Gyu-Chul Yi, *Appl. Phys. Lett.* 86(2),

021917 (2005)

Selected Oral Presentations in International Conferences

1. J. Yoo, Y. J. Hong, Y.-J. Kim, C.-H. Lee, and G.-C. Yi, "Fabrication of position-controlled ZnO coaxial nanotube quantum structure arrays", 2010 International Conference on the Physics of Semiconductors (ICPS), Seoul, Korea (20100725-20100730)
2. J. Yoo, Y. J. Hong, Y.-J. Kim, C.-H. Lee, L. S. Dang, K. H. Park, G.-C. Yi, "Fabrication and optical characteristics of position-controlled ZnO nanotubes and ZnO/ZnMgO coaxial nanotube quantum structure arrays", 2009 Materials Research Society Fall Meeting, Boston, USA (20091130-20091204)
3. Jinkyoung Yoo, Le Si Dang, Gyu-Chul Yi, Bonghwan Chon, Taiha Joo, "Exciton diffusion in MgZnO nanorods using ZnO/MgZnO nanorod quantum structures", 2009 Materials Research Society Fall Meeting, Boston, USA (20091130-20091204)
4. Jinkyoung Yoo, Young Joon Hong, Hye Seoung, Jung, Yong-Jin Kim, Chul-Ho Lee, Gyu-Chul Yi, "Position-controlled ZnO/MgZnO coaxial nanotube heterostructure arrays", 2009 Materials Research Society Fall Meeting, Boston, USA (20091130-20091204)
5. Jinkyoung Yoo, Won Il Park, Chinkyoo Kim, Gyu-Chul Yi, "Formation of embedded quantum dot in ZnO/MgZnO nanorod multiple-quantum-well structure", 5th International Conference on Semiconductor Quantum Dots (QD2008), Gyeongju, Korea (20080511-20080516)
6. Jinkyoung Yoo and Gyu-Chul Yi, "Exciton diffusion in ZnO/MgZnO nanorod single-quantum-well structure", Joint Symposium on Materials Science and Engineering for the 21st Century, National Tsing Hua University, Hsinchu, Taiwan (20071021-20071024)
7. Jinkyoung Yoo and Gyu-Chul Yi, "Exciton diffusion in ZnO/MgZnO nanorod single-quantum-well structure", 14th International Workshop on Oxide Electronics (WOE-14), Ramada Plaza Hotel, Jeju island, Korea (20071007-20071010)
8. Jinkyoung Yoo, Gyu-Chul Yi, Sang-Wook Han, Bonghwan Cheon, and Taiha Joo, "Catalys-free metalorganic chemical vapor deposition of vertically aligned $Mg_xZn_{1-x}O$ nanorods", ASIA NANO, Paradise Hotel, Busan, Korea (2006. 11)
9. Jinkyoung Yoo and Gyu-Chul Yi, "Undoped and doped ZnO nanorods", Electronic Materials Conference, TMS, Pennsylvania State Conference Center, State College, PA,

USA (20060628-20060630)

10. Jinkyoung Yoo, Gyu-Chul Yi, Bonghwan Chon, Taiha Joo, Takashi Yatsui, and Motoichi Ohtsu, "Photoluminescent characteristics of ZnO/Mg_{0.2}Zn_{0.8}O coaxial nanorod quantum structures", Electronic Materials Conference, TMS / Pennsylvania State Conference Center, State College, PA, USA (20060628-20060630)
11. Jinkyoung Yoo, Won Il Park, Dong-Wook Kim, Gyu-Chul Yi, and Miyoung Kim, "Fabrication and photoluminescence properties of ZnO/Mg_{0.2}Zn_{0.8}O coaxial nanorod heterostructures", Materials Research Society Spring Meeting 2006, Materials Research Society, Moscone West, San Francisco, CA, USA (20060417-20060421)
12. Jinkyoung Yoo, Won Il Park, Gyu-Chul Yi, "Effect of hydrogen plasma treatment on electron emission characteristics of ZnO nanoneedles", Materials Research Society Fall Meeting 2004, Materials Research Society, Hynes Convention Center, Boston, MA, USA (20041129-20041203)

Patents

Registered

1. "Growth method of nanocone and Fabricating method of light emitting diode using the same", Jong-Wook Kim, Hyun Kyung Cho, Gyu-Chul Yi, Sung Jin An, Jinkyoung Yoo, Young Joon Hong, Korea Patent 10-2007-0091828 (2007. 9. 12)
2. "Core-shell structures nanoneedle and plasma display panel comprising same as protective film", Jinkyoung Yoo, Gyu-Chul Yi, Korea Patent 10-0593266 (2006. 6. 19)
3. "Semiconductor nanomaterials and treatment thereof using gas plasma for field emission", Jinkyoung Yoo, Gyu-Chul Yi, Korea Patent 10-0617482 (2006. 8. 22)
4. "Zinc oxide nanoneedle preparation thereof, and electronic device using same", Won Il Park, Jinkyoung Yoo, Gyu-Chul Yi, Korea Patent 10-0536483 (2005. 12. 7)

Pending

1. "Semiconductor nanostructures and fabrication method thereof field emission device and field emission display", Yong-Jin Kim, Gyu-Chul Yi, Chul-Ho Lee, Young Joon Hong, Jinkyoung Yoo, Korea Patent 10-2008-133885 (2008. 12. 24)
2. "Radiation detector having coated nanostructure and method", Marian Cheolwa, Lau Shu Ping, Jinkyoung Yoo, Gyu-Chul Yi, USA Patent 11/129,582 (2005. 5. 13)

References

Prof. Gyu-Chul Yi (Advisor for PhD.)

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