

ในปัจจุบันทีมีวิจัยมีนิติตปริญญาเอก 4 คน นิติตปริญญาโท 8 คน และนิติตปริญญาตรี 6 คน ที่กำลังทำวิทยานิพนธ์ และ Senior Projects ในหัวข้อต่าง ๆ ที่เกี่ยวข้องกับการใช้โครงสร้างระดับนาโนเมตร เพื่อใช้งานด้านนาโนอิเล็กทรอนิกส์ และนาโนโฟโตนิกส์

ผลผลิตด้านกำลังคนจากห้องปฏิบัติการวิจัยสิ่งประดิษฐ์สารกึ่งตัวนำ ภาควิชาวิศวกรรมไฟฟ้า คณะวิศวกรรมศาสตร์ จุฬาลงกรณ์มหาวิทยาลัยที่ผ่านมา ได้ออกไปมีส่วนพัฒนางานด้านวิจัยและพัฒนาของเทคโนโลยีขั้นสูง ทั้งในหน่วยงานวิจัยแห่งชาติ ทั้งในและต่างประเทศ (เยอรมัน / ฝรั่งเศส / ญี่ปุ่น) และบริษัทเอกชนที่เป็นอุตสาหกรรมการผลิตด้านสิ่งประดิษฐ์สารกึ่งตัวนำ ด้านโฟโตนิกส์ และด้านฮาร์ดแวร์ของประเทศ

Outputs ที่ได้จากโครงการวิจัย

1. ผลงานที่ตีพิมพ์

1.1 บทความวิชาการที่ตีพิมพ์ในวารสารนานาชาติ (เอกสารแนบในภาคผนวก)

- 1.1.1 “Self-Assembled InAs Lateral Quantum Dot Molecules Growth on (001) GaAs by Thin-Capping-and-Regrowth MBE Technique”, Suwaree Suraprapapich, Supachok Thainoi, Songphol Kanjanachuchai, and Somsak Panyakeow, Journal of Solid State Phenomena, Vols. 121-123, pp. 395-399, 2007.
- 1.1.2 “Aligned Quantum Dot Molecules with 4 Satellite Dots by Self Assembly”, Naparat Siripitakchai, Cho Cho Thet, Somsak Panyakeow, and Songphol Kanjanachuchai, Journal of Microelectronic Engineering, Vol. 85, pp. 1218-1221, January, 2008.
- 1.1.3 “Nanometer-Scale $\text{In}_{0.5}\text{Ga}_{0.5}\text{As}$ Ring-Like Structure Grown by Droplet Epitaxy”, Naraporn Pankaow, Somsak Panyakeow, and Somchai Ratanathamphan, Journal of Advanced Materials Research, Vol. 31, pp. 123-125, 2008.
- 1.1.4 “In-Mole-Fraction and Thickness of Ultra-thin InGaAs Insertion Layers Effects on the Structural and Optical Properties of InAs Quantum Dots”, Poonyaseri Boonpeng, Somsak Panyakeow, and Somchai Ratanathamphan, Journal of Advanced Materials Research, Vol. 31, pp. 132-134, 2008.
- 1.1.5 “The Formation of InP Ring-Shape Nanostructures on $\text{In}_{0.49}\text{Ga}_{0.51}\text{P}$ Grown by Droplet Epitaxy”, Wipakorn Jevasuwan, Somsak Panyakeow, and Somchai Ratanathamphan, Journal of Advanced Materials Research, Vol. 31, pp. 158-160, 2008.

- 1.1.6 “Effective One-Dimensional Electronic Structure of InGaAs Quantum Dot Molecules”, Nitidet Thudsalingkarnsakul, Teeravat Limwongse, Naparat Siripitakchai, Somsak Panyakeow, and Songphol Kanjanachuchai, *Journal of Microelectronics Engineering*, Vol. 85, pp. 1225-1228, 2008.
- 1.1.7 “The Effects of Relaxed InGaAs Virtual Substrates on the Formation of Self-Assembled InAs Quantum Dots”, Cho Cho Thet, S. Sanorpim, Somsak Panyakeow, and Songphol Kanjanachuchai, *Journal of Semiconductor Science and Technology*, Vol. 23, 2008.
- 1.1.8 “Improved Quantum Confinement of Self-Assembled High-Density InAs Quantum Dot Molecules in AlGaAs/GaAs Quantum Well Structures by Molecular Beam Epitaxy”, Nan Thidar Chit Swe, Ongarj Tangmattajittakul, Suwaree Suraprapapich, Pornchai Changmoang, Supachok Thainoi, Chanin Wissawinthanon, Songphol Kanjanachuchai, Somchai Ratanathammaphan, and Somsak Panyakeow, *Journal of Vacuum Science and Technology B*, Vol. 26, No. 3, pp. 1100-1104, May, 2008.
- 1.1.9 “Low-Temperature Micro-PL Measurements of InAs Binary Quantum Dots on GaAs Substrate”, Nan Thidar Chit Swe, Suwaree Suraprapapich, Chanin Wissawinthanon, Somsak Panyakeow, Charles W. Tu, and Yasuhiko Arakawa, Non-members, *ECTI Transactions on Electrical Eng., Electronics, and Communications*, pp. 50-56, Vol. 6, No. 2, August, 2008.
- 1.1.10 “Optimization of Stacking High-Density Quantum Dot Molecules for Photovoltaic Effect”, Kittituch Laouthaiwattana, Ongarj Tangmattajittakul, Suwaree Suraprapapich, Supachok Thainoi, Pornchai Changmuang, Songphol Kanjanachuchai, Somchai Ratanathammaphan, and Somsak Panyakeow, *Journal of Solar Energy Materials & Solar Cells*, Vol. 93, pp. 746-749, 2009.
- 1.1.11 “The Effects of Rapid Thermal Annealing on Doubled Quantum Dots Grown by Molecular Beam Epitaxy”, Suwaree Suraprapapich, Y.M. Shen, Y. Fainman, Y. Horikoshi, Somsak Panyakeow, and Charles W. Tu, *Journal of Crystal Growth*, Vol. 311, pp. 1791-1794, 2009.
- 1.1.12 “Formation of $\text{In}_{0.5}\text{Ga}_{0.5}\text{As}$ Ring-and-Hole Structure by Droplet Molecular Beam Epitaxy”, Naraporn Pankaow, Somsak Panyakeow, and Somchai Ratanathammaphan, *Journal of Crystal Growth*, Vol. 311, pp. 1832-1835, 2009.

- 1.1.13 “Fabrication of $\text{In}_{0.15}\text{Ga}_{0.85}\text{As}$ Nanoholes on GaAs by Droplet Molecular Beam Epitaxy”, Poonyasiri Boonpeng, Somsak Panyakeow, and Somchai Ratanathamphan, *Journal of Crystal Growth*, Vol. 311, pp. 1843-1846, 2009.
- 1.1.14 “Self-Assembled InAs Quantum Dots on Cross-Hatch InGaAs Templates: Excess Growth, Growth Rate, Capping and Preferential Alignment”, Songphol Kanjanachuchai, Matinon Maitreeboriraks, Cho Cho Thet, Teeravat Limwongse, and Somsak Panyakeow, *Journal of Microelectronic Engineering*, Vol. 86, pp. 844-849, 2009.
- 1.1.15 “Quadra-Quantum Dots Grown on Quantum Rings Having Square-Shaped Holes: Basic Nanostructure for Quantum Dot Cellular Automata Application”, Poonyasiri Boonpeng, Wipakorn Jevasuwan, Suwaree Suraprapapich, Somchai Ratanathamphan, and Somsak Panyakeow, *Journal of Microelectronic Engineering*, Vol. 86, pp. 853-856, 2009.
- 1.1.16 “Evolution of InAs Quantum Dots Grown on Cross-Hatch Substrates”, Teeravat Limwongse, Somsak Panyakeow, and Songphol Kanjanachuchai, *Journal of Physica Status Solidi C*, Vol. 6, No. 4, pp. 806-809, 2009.
- 1.1.17 “Extended Optical Properties Beyond Band-Edge of GaAs by InAs Quantum Dots and Quantum Dot Molecules”, Ongarj Tangmettjittakul, Supachok Thainoi, Pornchai Changmoang, Songphol Kanjanachuchai, Somchai Ratanathamphan, and Somsak Panyakeow, *Journal of Microelectronic Engineering*, Vol. 87, pp. 1304-1307, 2010.
- 1.1.18 “Temperature-Dependent Photoluminescent Characteristics of Lateral InGaAs Quantum Dot Molecules”, Songphol Kanjanachuchai, Nitidet Thudsalingkarnsakul, Naparat Siripitakchai, Pornchai Changmoang, Supachok Thainoi, and Somsak Panyakeow, *Journal of Microelectronics Engineering*, Vol. 87, pp. 1352-1356, 2010.
- 1.1.19 “Influence of Crystallization Temperature on InP Ring-Shaped Quantum-Dot Molecules Grown by Droplet Epitaxy”, Wipakorn Jevasuwan, Poonyasiri Boonpeng, Somsak Panyakeow, and Somchai Ratanathamphan, *Journal of Microelectronic Engineering*, Vol. 87, pp. 1416-1419, 2010.



- 1.1.20 “Growth and Characterization of InP Ringlike Quantum-Dot Molecules Grown by Solid-Source Molecular Beam Epitaxy”, Wipakorn Jevasuwan, Poonyasiri Boonpeng, Somsak Panyakeow, and Somchai Ratanathamphan, *Journal of Nanoscience and Nanotechnology*, Vol. 10, pp. 1-4, 2010.
- 1.1.21 “Fabrication of Self-Assembled InGaAs Squarelike Nanoholes on GaAs(001) by Droplet Epitaxy”, Poonyasiri Boonpeng, Wipakorn Jevasuwan, Somsak Panyakeow, and Somchai Ratanathamphan, *Journal of Applied Physics*, Vol. 49, pp. 1-3, 2010.
- 1.1.22 “A Si-Doped GaAs/AlGaAs Solar Cell on (311) A GaAs Substrate”, Ongarj Tangmattajittakul, Supachok Thainoi, Somsak Panyakeow, and Somchai Ratanathamphan, *Compound Semiconductor Photonics Materials, Devices and Integration*, pp. 149-151, 2010.
- 1.1.23 “InGaAs Ring-Shaped Nanostructures Grown by Droplet Epitaxy”, Naraporn Pankaow, Somsak Panyakeow, and Somchai Ratanathamphan, *Compound Semiconductor Photonics Materials, Devices and Integration*, pp. 152-154, 2010.
- 1.1.24 “Effect of Substrate Temperature on $\text{In}_{0.15}\text{Ga}_{0.85}\text{As}/\text{GaAs}$ (001) Nanohole Templates Grown by Droplet Molecular Beam Epitaxy”, Poonyasiri Boonpeng, Somsak Panyakeow, and Somchai Ratanathamphan, *Compound Semiconductor Photonics Materials, Devices and Integration*, pp. 158-160, 2010.
- 1.1.25 “Dependency of In Thickness on the Properties of Self-assembled InP Ring-Shaped Nanostructures Grown by Droplet Molecular Beam Epitaxy”, Wipakorn Jevasuwan, Somsak Panyakeow, and Somchai Ratanathamphan, *Compound Semiconductor Photonics Materials, Devices and Integration*, pp. 161-163, 2010.
- 1.1.26 “Effect of Thickness of GaP Ultra-Thin Insertion Layer on the Structural and Optical Properties of InP Quantum Dots”, Soe Soe Han, Somsak Panyakeow, and Somchai Ratanathamphan, *Compound Semiconductor Photonics Materials, Devices and Integration*, pp. 176-178, 2010.

1.2 บทความวิชาการที่ตีพิมพ์ในประเทศ (เอกสารแนบในภาคผนวก)

- 1.2.1 “Quantum Nanostructures by Droplet Epitaxy”, (Invited Paper), Somsak Panyakeow, Transaction on Bio and Nano Engineering of the Chulalongkorn Engineering Journal, pp. 51-56, Vol. 13, 2009.

1.3 บทความที่นำเสนอในการประชุมวิชาการนานาชาติ (เอกสารแนบในภาคผนวก)

- 1.3.1 “Quantum Dot Molecules in Quantum Wells for Photovoltaic Applications”, Supachok Thainoi, Pornchai Changmuang, Suwaree Suraprapapich, Ongarj Tangmattajittakul, Songphol Kanjanachuchai, Somchai Ratanathammaphan, and Somsak Panyakeow, 22nd European Photovoltaic Solar Energy Conference and Exhibition (EU-PVSEC 2007), Milan, Italy, pp. 239-241, 3-7 September, 2007.
- 1.3.2 “Dot Homogeneity of Self-Assembled High Density InAs Quantum Dot Molecules in AlGaAs Quantum Well Structures by Molecular Beam Epitaxy”, Ongarj Tangmattajittakul, Suwaree Suraprapapich, Pornchai Changmoang, Supachok Thainoi, Songphol Kanjanachuchai, Somchai Ratanathammaphan, and Somsak Panyakeow, 25th North American Conf. on Molecular Beam Epitaxy (NAMBE 2007), Albuquerque, New Mexico, U.S.A., 23-26 September, 2007.
- 1.3.3 “Aligned Quantum Dot Molecules with 4 Satellite Dots by Self-Assembly Approach”, Napat Siripitakchai, Cho Cho Thet, Pornchai Changmoang, Supachok Thainoi, Songphol Kanjanachuchai, and Somsak Panyakeow, 33rd International Conference on Micro- and Nano-Engineering 2007, Copenhagen, Denmark, pp. 145-146, 23-26 September, 2007.
- 1.3.4 “Effect of Si-doping in In droplets on InP ring-like nanostructures on $\text{In}_{0.49}\text{Ga}_{0.51}\text{P}$ grown by droplet molecular beam epitaxy”, Wipakorn Jevasuwan, Somsak Panyakeow, and Somchai Ratanathammaphan, 33rd International Conference on Micro- and Nano-Engineering 2007, Copenhagen, Denmark, pp. 619-620, 23-26 September, 2007.
- 1.3.5 “Electronic Structure of Embedded InAs Quantum Dot Molecules”, Nitidet Thudsalingkarnsakul, Teeravat Limwongse, Napat Siripitakchai, Somsak Panyakeow, and Songphol Kanjanachuchai, 33rd International Conference on Micro- and Nano-Engineering 2007, Copenhagen, Denmark, pp. 643-644, 23-26 September, 2007.

- 1.3.6 “Optimization of Stacking High-Density Quantum Dot Molecules for Photovoltaic Effect”, Kittituch Laouthaiwattana, Ongarj Tangmattajittakul, Suwaree Suraprapapich, Supachok Thainoi, Pornchai Changmuang, Songphol Kanjanachuchai, Somchai Ratanathamphan, and Somsak Panyakeow, The 17th International Photovoltaic Science and Engineering Conference (PVSEC-17), Fukuoka, Japan, pp. 927-928, 3-7 December, 2007.
- 1.3.7 “InAs Bi-Quantum Dot Molecules and their Photoluminescence Characteristics”, Nan Thidar Chit Swe, Suwaree Suraprapapich, Chanin Wissawinthon, Somsak Panyakeow, and Charles W. Tu, 29th International Conference on the Physics of Semiconductors, (ICPS 2008), Rio de Janeiro, RJ, Brazil, pp. 426-427, 27 July - 1 August, 2008.
- 1.3.8 “Thermal Annealing Effects on Doubled Quantum Dots Grown by Molecular Beam Epitaxy”, Suwaree Suraprapapich, Y.M. Shen, Y. Fainman, Y. Horikoshi, Somsak Panyakeow and Charles W. Tu, 15th International Conference on Molecular Beam Epitaxy, (MBE 2008), The University of British Columbia, Vancouver, Canada, pp. 9, 3-8 August, 2008.
- 1.3.9 “Multi-Stacked High Density InAs Quantum Dot Molecules Having Uniform Dots and Dot Alignment Grown by Multi-Cycled MBE Process”, Suwaree Suraprapapich, Ongarj Tangmattajittakul, Supachok Thainoi, Songphol Kanjanachuchai, Somchai Ratanathamphan, and Somsak Panyakeow, 15th International Conference on Molecular Beam Epitaxy, (MBE 2008), The University of British Columbia, Vancouver, Canada, pp. 108, 3-8 August, 2008.
- 1.3.10 “Formation of $\text{In}_{0.5}\text{Ga}_{0.5}\text{As}$ Ring-and-Hole Structure by Droplet Molecular Beam Epitaxy”, Naraporn Pankaow, Somsak Panyakeow and Somchai Ratanathamphan, 15th International Conference on Molecular Beam Epitaxy, (MBE 2008), The University of British Columbia, Vancouver, Canada, pp. 220, 3-8 August, 2008.
- 1.3.11 “Fabrication of $\text{In}_{0.15}\text{Ga}_{0.85}\text{As}$ Nanoholes on GaAs by Droplet Molecular Beam Epitaxy”, Poonyaseri Boonpeng, Somsak Panyakeow and Somchai Ratanathamphan, 15th International Conference on Molecular Beam Epitaxy, (MBE 2008), The University of British Columbia, Vancouver, Canada, pp. 221, 3-8 August, 2008.

- 1.3.12 “One-Dimensional Alignment of Self-Assembled InAs Quantum Dots on Strain-Engineered Templates”, Matinon Maitreeboriraks, Somsak Panyakeow, and Songphol Kanjanachuchai, The 34th International Conference on Micro & Nano Engineering, pp. 235, 15-19 September, 2008.
- 1.3.13 “Effects of Overgrowth and Capping of InAs Quantum Dots Grown on Cross-Hatch Surfaces”, Songphol Kanjanachuchai, Teeravat Limwongse, Cho Cho Thet, and Somsak Panyakeow, The 34th International Conference on Micro & Nano Engineering, pp. 236, 15-19 September, 2008.
- 1.3.14 “Quadra-Quantum Dots Grown on Quantum Rings Having Square-Shaped Holes: Basic Nanostructure for Quantum Dot Cellular Automata Application”, Poonyaseri Boonpeng, Suwaree Suraprapapich, Somchai Ratanathammaphan, and Somsak Panyakeow, The 34th International Conference on Micro & Nano Engineering, pp. 456, 15-19 September, 2008.
- 1.3.15 “Optical Polarization Characteristics of Self-Assembled Laterally-Aligned Quantum Dots”, Chonlakorn Chiewpanich, Nan Thidar Chit Swe, Suwaree Suraprapapich, Somsak Panyakeow, and Chanin Wissawinthanon, The 34th International Conference on Micro & Nano Engineering, pp. 504, 15-19 September, 2008.
- 1.3.16 “Development of Semiconductor Quantum Nanostructures at Chulalongkorn University”, (Invited Talk), Somsak Panyakeow, The 18th International Photovoltaic Science and Engineering Conference & Exhibition, (PVSEC 18), Science City Convention Center, Kolkata, India, 19-23 January, 2009.
- 1.3.17 “A Si-Doped GaAs/AlGaAs Solar Cell on (311) A GaAs Substrate”, Ongarj Tangmattajittakul, Supachok Thainoi, Somsak Panyakeow, and Somchai Ratanathammaphan, International Conference on Materials for Advanced Technologies, (ICMAT 2009), Singapore, pp. 17, 28 June-3 July, 2009.
- 1.3.18 “InGaAs Ring-Shaped Nanostructures Grown by Droplet Epitaxy”, Naraporn Pankaow, Somsak Panyakeow, and Somchai Ratanathammaphan, International Conference on Materials for Advanced Technologies, (ICMAT 2009), Singapore, pp. 18-19, 28 June-3 July, 2009.

- 1.3.19 “Effect of Substrate Temperature on $\text{In}_{0.15}\text{Ga}_{0.85}\text{As}/\text{GaAs}$ (001) Nanohole Templates Grown by Droplet Molecular Beam Epitaxy”, Poonyaseri Boonpeng, Somsak Panyakeow, and Somchai Ratanathamphan, International Conference on Materials for Advanced Technologies, (ICMAT 2009) Singapore, pp.22, 28 June-3 July, 2009.
- 1.3.20 “Dependency of In Thickness on the Properties of Self-assembled InP Ring-Shaped Nanostructures Grown by Droplet Molecular Beam Epitaxy”, Wipakorn Jevasuwan, Somsak Panyakeow, and Somchai Ratanathamphan, International Conference on Materials for Advanced Technologies, (ICMAT 2009), Singapore, pp. 23-24, 28 June-3 July, 2009. (Best Poster Award)
- 1.3.21 “Effect of Thickness of GaP Ultra-Thin Insertion Layer on the Structural and Optical Properties of InP Quantum Dots”, Soe Soe Han, Somsak Panyakeow, and Somchai Ratanathamphan, International Conference on Materials for Advanced Technologies, (ICMAT 2009), Singapore, pp. 35, 28 June-3 July, 2009.
- 1.3.22 “Fabrication of $\text{In}_{0.15}\text{Ga}_{0.85}\text{As}/\text{GaAs}$ (001) Nanohole Templates Grown by Droplet Molecular Beam Epitaxy”, Poonyasiri Boonpeng, Wipakorn Jevasuwan, Somsak Panyakeow, and Somchai Ratanathamphan, International Conference on Nanoscience and Technology, ChinaNANO 2009, Beijing, China, pp. 447, 1-3 September, 2009.
- 1.3.23 “Growth and Characterization of InP Ringlike Quantum-dot Molecules Grown by Solid-source Molecular-beam Epitaxy”, Wipakorn Jevasuwan, Poonyasiri Boonpeng, Somsak Panyakeow, and Somchai Ratanathamphan, International Conference on Nanoscience and Technology, ChinaNANO 2009, Beijing, China, pp. 447, 1-3 September, 2009.
- 1.3.24 “Temperature-Dependent Optical Properties of Self-Assembled InGaAs Quantum Dot Molecules”, Songphol Kanjanachuchai, Nitidet Thudsalingkarnsakul, Napatat Siripitakchai, Pornchai Changmoang, Supachok Thainoi, and Somsak Panyakeow, The 35th International Conference on Micro & Nano Engineering, Ghent, Belgium, pp. 71, 28 September-1 October, 2009.

- 1.3.25 “Influence of Crystallization Temperature on InP Ring-Shaped Quantum-Dot Molecules Grown by Droplet Epitaxy”, Wipakorn Jevasuwan, Poonyasiri Boonpeng, Somsak Panyakeow, and Somchai Ratanathammaphan, The 35th International Conference on Micro & Nano Engineering, Ghent, Belgium, pp. 72, 28 September-1 October, 2009.
- 1.3.26 “Extended Optical Properties Beyond Band-Edge of GaAs by InAs Quantum Dots and Quantum Dot Molecules”, Somsak Panyakeow, Ongarj Tangmattajittakul, Supachok Thainoi, Pornchai Changmoang, Songphol Kanjanachuchai, and Somchai Ratanathammaphan, The 35th International Conference on Micro & Nano Engineering, Ghent, Belgium, pp. 77, 28 September-1 October, 2009.
- 1.3.27 “InP Ring-shaped Quantum-dot Molecules Formed by Droplet Epitaxy Grown by Solid-source Molecular Beam Epitaxy”, Wipakorn Jevasuwan, Poonyasiri Boonpeng, Somsak Panyakeow, and Somchai Ratanathammaphan, ASIA NANOTECH CAMP 2009, Taiwan, 28 September-12 October, 2009. (Best Poster Award)
- 1.3.28 “Fabrication of $\text{In}_{0.15}\text{Ga}_{0.85}\text{As}$ Nanohole Templates on GaAs (001) for Quantum Dot Molecules”, Poonyasiri Boonpeng, Wipakorn Jevasuwan, Somsak Panyakeow, and Somchai Ratanathammaphan, The 2009 International Conference on Solid State Devices and Materials (SSDM 2009), Sendai Kokusai Hotel, Japan, pp. 555-556, 7-9 October, 2009.
- 1.3.29 “InP Ring-Shaped Quantum-Dot Molecules Grown by Droplet Molecular Beam Epitaxy”, Wipakorn Jevasuwan, Poonyasiri Boonpeng, Somsak Panyakeow, and Somchai Ratanathammaphan, The 2009 International Conference on Solid State Devices and Materials (SSDM 2009), Sendai Kokusai Hotel, Japan, pp. 830-831, 7-9 October, 2009.
- 1.3.30 “Formation of Quantum-Dot Molecules on Deformed Nanohole Templates”, Poonyasiri Boonpeng, Wipakorn Jevasuwan, Somsak Panyakeow, and Somchai Ratanathammaphan, The Collaborative Conference on Interacting Nanostructures (CCIN-2009), San Diego, California, USA., pp. 23, 9-13 November, 2009.

- 1.3.31 “Influence of Ultra-thin GaP Insertion Layer on the Structural of InP Quantum Dots Grown by Solid-source Molecular Beam Epitaxy”, Soe Soe Han, Somsak Panyakeow, and Somchai Ratanathamphan, The First International Conference on Science and Engineering (ICSE 2009), Sedona Hotel, Yangon, Myanmar, pp. 12-16, 4-5 December, 2009. (Best Presentation Award)
- 1.3.32 “Improved Spectral Response of Quantum Dot Solar Cells Using InAs Multi-stack High Density Quantum Dot Molecules” Ongarj Tangmettjittakul, Pornchai Changmoang, Supachok Thainoi, Songphol Kanjanachuchai, Somchai Ratanathamphan, and Somsak Panyakeow, MRS Spring Meeting 2010, San Francisco, USA, 4-8 April, 2010.
- 1.3.33 “Study on Spectral Responses of Schottky-Type Multi-Stack High Density Quantum Dot Molecule Photovoltaic Cells at Concentrated Light” Ongarj Tangmettjittakul, Supachok Thainoi, Pornchai Changmoang, Songphol Kanjanachuchai, Somchai Ratanathamphan, and Somsak Panyakeow, 35th IEEE Photovoltaic Specialist Conference, Hawaii, USA, 20-25 June 2010.
- 1.3.34 “In_xGa_{1-x}As/GaAs Quantum Rings Grown by Droplet Epitaxy”, Naraporn Pankaow, Somsak Panyakeow, and Somchai Ratanathamphan, The 30th International Conference on the Physics of Semiconductors, Seoul, Korea, 25-30 July, 2010.
- 1.3.35 “InP Ring-shaped Quantum-dot Molecules Grown by Droplet Molecular Beam Epitaxy”, Wipakorn Jevasuwan, Poonyasiri Boonpeng, Supachok Thainoi, Somchai Ratanathamphan, and Somsak Panyakeow, The 16th International Conference on Molecular Beam Epitaxy (MBE 2010), Berlin, Germany, 22-27 August, 2010.
- 1.3.36 “Transformation of Concentric Quantum Double Rings to Single Quantum Rings with Squarelike Nanoholes on GaAs(001) by Droplet Epitaxy”, Poonyasiri Boonpeng, Wipakorn Jevasuwan, Supachok Thainoi, Somchai Ratanathamphan, and Somsak Panyakeow, The 16th International Conference on Molecular Beam Epitaxy (MBE 2010), Berlin, Germany, 22-27 August, 2010.
- 1.3.37 “Surface morphology and photoluminescence of InGaAs quantum rings grown by droplet epitaxy with varying In_{0.5}Ga_{0.5}-droplet amount”, Naraporn Pankaow, Supachok Thainoi, Somsak Panyakeow, and Somchai Ratanathamphan, The 16th International Conference on Molecular Beam Epitaxy (MBE 2010), Berlin,

Germany, 22-27 August, 2010.

- 1.3.38 “MBE Growth Process and PL Characterization of Multi-stack QDs and Multi-stack High Density QDMs”, Ongarj Tangmettjittakul, Supachok Thainoi, Pornchai Changmoung, Songphol Kanjanachuchai, Sonchai Ratanathamphan, and Somsak Panyakeow, The 16th International Conference on Molecular Beam Epitaxy (MBE 2010), Berlin, Germany, 22-27 August, 2010.
- 1.3.39 “Self-Assembled Quantum Dots on Anti-Phase Domains of GaAs on Ge Substrates”, WiChit Tantiweerasophon, Supachok Thainoi, Pornchai Changmoung, Songphol Kanjanachuchai, Somchai Ratanathamphan, and Somsak Panyakeow, The 16th International Conference on Molecular Beam Epitaxy (MBE 2010), Berlin, Germany, 22-27 August, 2010.
- 1.3.40 “Growth and Photoluminescence of Lateral InGaAs Quantum Dot Molecules”, Songphol Kanjanachuchai, Natapong Thongkamkoon, Naparat Siripitakchai, Supachok Thainoi, and Somsak Panyakeow, The 16th International Conference on Molecular Beam Epitaxy (MBE 2010), Berlin, Germany, 22-27 August, 2010.

1.4 บทความที่นำเสนอในการประชุมวิชาการในประเทศ (เอกสารแนบในภาคผนวก)

- 1.4.1 “Optical Polarization Property of the Photoluminescence from InAs/GaAs Linearly Aligned Quantum Dots”, Chanin Wissawinthanon, Nan Thidar Chit Swe, and Somsak Panyakeow, Thailand Research Fund’s annual meeting, The Ambassador City Hotel, Pattaya, 11-13 October, 2007.
- 1.4.2 “Excitation-Power and Temperature-Dependent Optical Properties of Binary Quantum Dots”, Nan Thidar Chit Swe, Suwaree Suraprapapich, Chanin Wissawinthanon, and Somsak Panyakeow, and Charles W. Tu, 30th Electrical Engineering Conference, (EECON-30), Felix River Kwai Resort, Kanchanaburi, Thailand, pp. 953-956, 25-26 October, 2007. (Best Paper Award)
- 1.4.3 “Temperature and Size Dependencies of GaAs and InAs Quantum Cellular Automata”, Kanjanawit Yanggratoke, and Songphol Kanjanachuchai, 30th Electrical Engineering Conference, (EECON-30), Felix River Kwai Resort, Kanchanaburi, Thailand, pp. 957-960, 25-26 October, 2007.

- 1.4.4 “Correlation Between Luminescence Properties and Geometry of InAs Quantum Dots”, Teeravat Limwongse, Nitidet Thudsalingkarnsakul, Somsak Panyakeow, and Songphol Kanjanachuchai, 30th Electrical Engineering Conference, (EECON-30), Felix River Kwai Resort, Kanchanaburi, Thailand, pp. 981-984, 25-26 October, 2007.
- 1.4.5 “Study and Fabrication of InP Nanostructures by Droplet Molecular Beam Epitaxy”, Wipakorn Jevasuwan, Poonyaseri Boonpeng, Pornchai Changmoang, Supachok Thainoi, Somsak Panyakeow, and Somchai Ratanathamphan, 30th Electrical Engineering Conference, (EECON-30), Felix River Kwai Resort, Kanchanaburi, Thailand, pp. 1285-1288, 25-26 October, 2007.
- 1.4.6 “Effect of Indium Composition of InGaAs insertion Layer on InAs Quantum Dots”, Poonyaseri Boonpeng, Pornchai Changmoang, Supachok Thainoi, Somsak Panyakeow, and Somchai Ratanathamphan, 30th Electrical Engineering Conference, (EECON-30), Felix River Kwai Resort, Kanchanaburi, Thailand, pp. 1289-1292, 25-26 October, 2007.
- 1.4.7 “InP Ring-Shape Nanostructures on $\text{In}_{0.49}\text{Ga}_{0.51}\text{P}$ Grown by Droplet Epitaxy”, Wipakorn Jevasuwan, Somsak Panyakeow, and Somchai Ratanathamphan, RGJ-Ph.D. Congress IX, The Royal Golden Jubilee Ph.D. Program, The Thailand Research Fund, Jomtien Palm Beach Resort Pattaya, Chonburi, pp. 237, 4-6 April, 2008.
- 1.4.8 “The Effect of In Deposition Rate on the Properties of InP Nanostructures Grown by Droplet Molecular Beam Epitaxy”, Wipakorn Jevasuwan, Somsak Panyakeow, and Somchai Ratanathamphan, The 31st Electrical Engineering Conference (EECON-31), Royalhills Golf Resort and Spa, Nakornnayok, pp. 1031-1034, 29-31 October, 2008.
- 1.4.9 “Effect of The Thickness of InGaAs Insertion Layer on InAs Quantum Dots”, Poonyaseri Boonpeng, Pornchai Changmoang, Supachok Thainoi, Somsak Panyakeow, and Somchai Ratanathamphan, The 31st Electrical Engineering Conference (EECON-31), Royalhills Golf Resort and Spa, Nakornnayok, pp. 1047-1050, 29-31 October, 2008.

- 1.4.10 “Molecular Beam Epitaxial Growth of GaAs on Ge Substrates and their Photonic Device Applications”, Wichit Tantiweerasophon, Suwaree Suraprapapich, Noppadon Nuntawong, Supachok Thainoi, and Somsak Panyakeow, The 31st Electrical Engineering Conference (EECON-31), Royalhills Golf Resort and Spa, Nakornnayok, pp. 1197-1200, 29-31 October, 2008.
- 1.4.11 “Formation of $\text{In}_{0.5}\text{Ga}_{0.5}\text{As}$ Ring-and-Hole Structure by Droplet Molecular Beam Epitaxy”, Naraporn Pankaow, Somsak Panyakeow, and Somchai Ratanathamphan, RGJ-Ph.D. Congress X, The Royal Golden Jubilee Ph.D. Program, Thailand Research Fund, Jomtien Palm Beach Resort Pattaya, Chonburi, pp. 141, 3-5 April, 2009.
- 1.4.12 “The Effect of In Thickness on the Properties of InP Ring-Shape Quantum-Dot Molecules Grown by Droplet Molecular Beam Epitaxy”, Wipakorn Jevasuwan, Supachok Thainoi, Pornchai Changmuang, Somsak Panyakeow, and Somchai Ratanathamphan, RGJ-Ph.D. Congress X, The Royal Golden Jubilee Ph.D. Program, The Thailand Research Fund, Jomtien Palm Beach Resort Pattaya, Chonburi, pp. 233, 3-5 April, 2009.
- 1.4.13 “The Formation of Self-Assembled Semiconductor Quantum Rings by Molecular Beam Epitaxy”, P. Buranasiri, Somsak Panyakeow, 9th Annual Meeting of Thailand Research Fund, Holiday Inn Resort Regent Beach, Cha-am, Petchburi, pp. 381, 15-17 October, 2009.
- 1.4.14 “Optical Polarization Characteristics of Self-Assembled Laterally-Aligned Quantum Dots”, Chanin Wissawinthanon, Chonlakorn Chiewpanich, Nan Thidar Chit Swe, Suwaree Suraprapapich, and Somsak Panyakeow, The 32nd Electrical Engineering Conference (EECON-32), Tawaravadee Resort Hotel, Prachinburi, Thailand, pp. 857-861, 28-30 October, 2009.
- 1.4.15 “The Role of Thickness of GaP Ultra-thin Insertion Layer on Characterization of The Structure Property of InP Quantum Dots”, Soe Soe Han, Somsak Panyakeow, and Somchai Ratanathamphan, The 32nd Electrical Engineering Conference (EECON-32), Tawaravadee Resort Hotel, Prachinburi, Thailand, pp. 863-866, 28-30 October, 2009. (Best Paper Award)

- 1.4.16 “Comparison Between Two Techniques for The Growth of Self-assembled Laterally-aligned Quantum Dots: The Superlattice Template and The InGaAs Induction Layer”, Chonlakorn Chiewpanich, Chanin Wissawinthanon, and Somsak Panyakeow, The 32nd Electrical Engineering Conference (EECON-32), Tawaravadee Resort Hotel, Prachinburi, Thailand, pp. 915-918, 28-30 October, 2009.
- 1.4.17 “Effect of Si Effusion Cell Temperature on Si-doped p-n (311)A GaAs Photovoltaic Cell” Ongarj Tnagmettjittakul, Supachok Thainoi, Somsak Panyakeow, and Somchai Ratanathamphan, The 32nd Electrical Engineering Conference (EECON-32), Tawaravadee Resort Hotel, Prachinburi, Thailand, pp. 1171-1173, 28-30 October, 2009.
- 1.4.18 “InP Ring-shaped Quantum-dot Molecules for Extended Quantum-dot Cellular Automata”, Wipakorn Jevasuwan, Poonyasiri Boonpeng, Pornchai Changmoang, Supachok Thainoi, Noppadon Nuntawong, Somsak Panyakeow, and Somchai Ratanathamphan, The 32nd Electrical Engineering Conference (EECON-32), Tawaravadee Resort Hotel, Prachinburi, Thailand, pp. 1179-1182, 28-30 October, 2009. (Best Paper Award)
- 1.4.19 “Fabrication of $\text{In}_{0.15}\text{Ga}_{0.85}\text{As}$ Nanohole Templates on GaAs(001)”, Poonyasiri Boonpeng, Wipakorn Jevasuwan, Pornchai Changmoang, Supachok Thainoi, Somsak Panyakeow, and Somchai Ratanathamphan, The 32nd Electrical Engineering Conference (EECON-32), Tawaravadee Resort Hotel, Prachinburi, Thailand, pp. 1239-1242, 28-30 October, 2009.
- 1.4.20 “Improved Effective One-Dimensional Electronic Structure of InGaAs Quantum Dot Molecules”, Nirat Pattanemakul, Natapong Thongkamkoon, Nitidet Thudsalingkarnsakul, Naparat Siripitakchai, Supachok Thainoi, Somsak Panyakeow, and Songphol Kanjanachuchai, ECTI-CON 2010, The Empress Hotel Convention Centre, Chiang Mai, Thailand, 19-21 May, 2010.
- 1.4.21 “Effect of Substrate Position on the Formation of ZnO Nanostructures Synthesized by Thermal Evaporation of ZnO-CNTs Mixture”, Sukum Pitayapiboonpong, Songphol Kanjanachuchai, Ditsayut Phokharatkul, Adisorn Tuantranont, and Anurat Wisitsoraat, ECTI-CON 2010, The Empress Hotel Convention Centre, Chiang Mai, Thailand, 19-21 May, 2010.

1.5 บทความที่นำเสนอในการบรรยายพิเศษ (เอกสารแนบในภาคผนวก)

- 1.5.1 “Nanoelectronics and Nanophotonics”, (Invited Talk), Somsak Panyakeow, Thailand Research Fund’s annual meeting, The Ambassador City Hotel, Pattaya, 11-13 October, 2007.
- 1.5.2 “Self-Assembled Quantum Dots and Quantum Dot Molecules: Their Basic Properties and Potential Applications”, (Invited Talk), Somsak Panyakeow, The Second International Workshop on “Positioning of Single Nanostructures” at Hotel Zollernblick, Freudenstadt-Lauterbad, Germany, 15-16 November, 2007.
- 1.5.3 “Self-Assembled Quantum Dots for Nanoelectronic and Nanophotonic Applications”, (Invited Talk), Somsak Panyakeow, Nano Thailand Symposium 2008 (NTS 2008), International Conference & Exhibition, Queen Sirikit National Convention Center, Bangkok, 6-8 November, 2008.
- 1.5.4 “Semiconductor Quantum Nanostructures for Nanoelectronic and Nanophotonic Applications”, (Invited Talk), Somsak Panyakeow, Laboratoire d’ Analyse et d’ Architecture des Systèmes du CNRS, Toulouse, France, 14 November, 2008.
- 1.5.5 “Semiconductor Nanostructures by Droplet Epitaxy”, (Invited Talk), Somsak Panyakeow, NSTDA Annual Conference (NAC 2009), 12-14 March, 2009.
- 1.5.6 “Basic Research on Energy Efficient Nanoelectronic & Nanophotonic Devices”, (Invited Talk), Somsak Panyakeow, ONR/ONR-Global Alternative/Renewable Energy Solutions for Island Environments Pacific Forum organized by Office of Naval Research (ONR) at Westin Miyako, Kyoto, Japan, 25-27 May, 2009.
- 1.5.7 “Development of Photonic Devices & Solar Cells and Their Potential ITS Applications”, (Invited Talk), Somsak Panyakeow, presented at International Symposium on ITS Research 2009, Bangkok, 11 July, 2009.
- 1.5.8 “Quantum Dot Devices for Quantum Computation”, Somsak Panyakeow, Advanced Workshop on Spin and Charge Properties of Low Dimensional Systems, Organized by International Centre for Theoretical Physics (ICTP), Sibiu, Romania, 29 June-4 July, 2009.
- 1.5.9 “Sustainable Nanofoundation for Green Society”, Somsak Panyakeow, Plenary talk at International Conference on Processing Materials for Properties-III (PMP-III), Chaophya Park Hotel, Bangkok, 11 August, 2009.

- 1.5.10 “Spintronics”, (Invited Talk), Somsak Panyakeow, 9th Annual Meeting of Thailand Research Fund, Holiday Inn Resort Regent Beach, Cha-am, Petchburi, 15-17 October, 2009.
- 1.5.11 “EE for Better Life” (Keynote Speaker), Somsak Panyakeow, The 32nd Electrical Engineering Conference (EECON-32), Tawaravadee Resort Hotel, Prachinburi, Thailand, pp. K3-1-K3-3, 28-30 October, 2009.
- 1.5.12 “Semiconductor QDs and Their Applications”, (Invited Talk), Somsak Panyakeow, Southeast Asian International Advances in Micro/Nano-Technology (SAIAM-2010), International School of Engineering, Faculty of Engineering, Chulalongkorn University, Bangkok, Montien Hotel, 8-11 March, 2010.

1.6 บทความที่ได้รับรางวัล (เอกสารแนบในภาคผนวก)

- 1.6.1 “Excitation-Power and Temperature-Dependent Optical Properties of Binary Quantum Dots”, Nan Thidar Chit Swe, Suwaree Suraprapapich, Chanin Wissawinthanon, and Somsak Panyakeow, and Charles W. Tu, 30th Electrical Engineering Conference, (EECON-30), Felix River Kwai Resort, Kanchanaburi, Thailand, pp. 953-956, 25-26 October, 2007. (Best Paper Award)
- 1.6.2 “Dependency of In Thickness on the Properties of Self-assembled InP Ring-Shaped Nanostructures Grown by Droplet Molecular Beam Epitaxy”, Wipakorn Jevasuwan, Somsak Panyakeow, and Somchai Ratanathamphan, International Conference on Materials for Advanced Technologies, (ICMAT 2009), Singapore, pp. 23-24, 28 June-3 July, 2009. (Best Poster Award)
- 1.6.3 “InP Ring-shaped Quantum-dot Molecules Formed by Droplet Epitaxy Grown by Solid-source Molecular Beam Epitaxy”, Wipakorn Jevasuwan, Poonyasiri Boonpeng, Somsak Panyakeow, and Somchai Ratanathamphan, ASIA NANOTECH CAMP 2009, Taiwan, 28 September-12 October, 2009. (Best Poster Award)
- 1.6.4 “The Role of Thickness of GaP Ultra-thin Insertion Layer on Characterization of The Structure Property of InP Quantum Dots”, Soe Soe Han, Somsak Panyakeow, and Somchai Ratanathamphan, The 32nd Electrical Engineering Conference (EECON-32), Tawaravadee Resort Hotel, Prachinburi, Thailand, pp. 863-866, 28-30 October, 2009. (Best Paper Award)

- 1.6.5 “InP Ring-shaped Quantum-dot Molecules for Extended Quantum-dot Cellular Automata”, Wipakorn Jevasuwan, Poonyasiri Boonpeng, Pornchai Changmoang, Supachok Thainoi, Noppadon Nuntawong, Somsak Panyakeow, and Somchai Ratanathamphan, The 32nd Electrical Engineering Conference (EECON-32), Tawaravadee Resort Hotel, Prachinburi, Thailand, pp. 1179-1182, 28-30 October, 2009. (Best Paper Award)
- 1.6.6 “Influence of Ultra-thin GaP Insertion Layer on the Structural of InP Quantum Dots Grown by Solid-source Molecular Beam Epitaxy”, Soe Soe Han, Somsak Panyakeow, and Somchai Ratanathamphan, The First International Conference on Science and Engineering (ICSE 2009), Sedona Hotel, Yangon, Myanmar, pp. 12-16, 4-5 December, 2009. (Best Presentation Award)

1.7 ผลงานที่ดำเนินการยื่นคำขอจดทะเบียนสิทธิบัตร (เอกสารแนบในภาคผนวก)

- 1.7.1 ชุดสี่เหลี่ยมจัตุรัสของสี่ควอนตัมดอต : องค์ประกอบพื้นฐานของควอนตัมเซลลูล่าร์ออโตมาต้า
Square Sets of Quadra Quantum Dots : Basic Elements of Quantum Cellular Automata
- 1.7.2 โซ่ควอนตัมดอตคู่; ศักยภาพเป็นท่อนำคลื่นอิเล็กตรอนเดี่ยวและสวิตช์
Bi-Quantum Dot Chains; Potential Single Electron Waveguides and Switches

ภาคผนวก

ผลงานที่ตีพิมพ์ในประเทศและต่างประเทศ

- (1) บทความวิชาการที่ตีพิมพ์ในวารสารนานาชาติ จำนวน 26 เรื่อง
- (2) บทความวิชาการที่ตีพิมพ์ในประเทศ จำนวน 1 เรื่อง
- (3) บทความที่นำเสนอในการประชุมวิชาการนานาชาติ จำนวน 40 เรื่อง
- (4) บทความที่นำเสนอในการประชุมวิชาการในประเทศ จำนวน 21 เรื่อง
- (5) บทความที่นำเสนอในการบรรยายพิเศษ จำนวน 12 เรื่อง
- (6) บทความที่ได้รับรางวัล จำนวน 6 เรื่อง
- (7) ผลงานที่ดำเนินการยื่นคำขอจดทะเบียนสิทธิบัตร 2 เรื่อง