Greeting;

Already 6 years have passed, since KANEKA/SKKU Incubation Center has been established on June 1st 2010 on the base of Japanese chemical company; Kaneka Corporation's full financial support.

As you may know, Japan has long history in industry and tradition to develop excellent basic and material technologies, as Kaneka has represented until now. And in Korea, there are dynamism and good technologies for electronics with excellent global companies such as Samsung, LG etc. Fusion of these two powers must be great influence to the market in the world. Our Incubation Center plays an important role to make a bridge between Korea and Japan.

KANEKA/SKKU International Symposium were held so far five times at Sungkyunkwan university with very outstanding professors and scholars; Prof. H. Shirakawa; Novel laureate invited in 2011 and Prof. H. Hosono; outstanding research on oxide semiconductor materials in 2014, etc. This year, we have also invited very famous scholars and engineers as shown in this program. They are usually so busy and it is hard to hear their talks. I would very much appreciate them to come to SKKU and give us wonderful lectures.

Finally, I hope all of you to enjoy this international symposium as before.

Thanks.

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Program

Chair person :

09:30 Opening

09:45 Hyuk Yu (University of Wisconsin-Madison)
"Evolutionary Directions of US Chemical Research"

10:35 Tomiki Ikeda (Chuo Univ.)
"Photomobile Polymer Materials: Structures and Functions"

11:15 Break

11:30 Changhoo Chun (Seoul National Univ.)
"Artificial Lighting for Plant Production in Vertical Farming"

12:10 Lunch

Chair person :

13:20 Junji Kido (Yamagata Univ.)
"White OLEDs for Displays and General Lighting"

14:00 Yasuo Nakane (Mizuho Securities Ltd.)
"Outlook on Flat Panel Display Industry, LCD or OLED?"

14:40 Taeghwan Hyeon (Seoul National Univ.)
"Designed Chemical Synthesis and Assembly of Uniform-sized Nanoparticles for Medical and Energy Applications"

15:20 Break

Chair person :

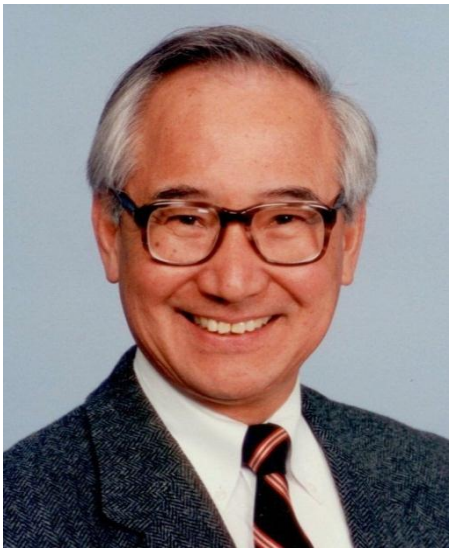
15:40 Gi-Ra Yi (Sungkyunkwan Univ.)
"High-Density DNA Brushes on Polymer Particles for Building Up Colloidal Superstructures"

16:20 Tsuyoshi Sekitani (Osaka Univ.)
"Imperceptible Sheet-Type Sensors for Cyber–Physical Systems"

17:00 Closing

17:15 Reception

“Evolutionary Directions of US Chemical Research”



Prof. Hyuk Yu

Professor Emeritus of Chemistry
University of Wisconsin
Madison, Wisconsin, USA

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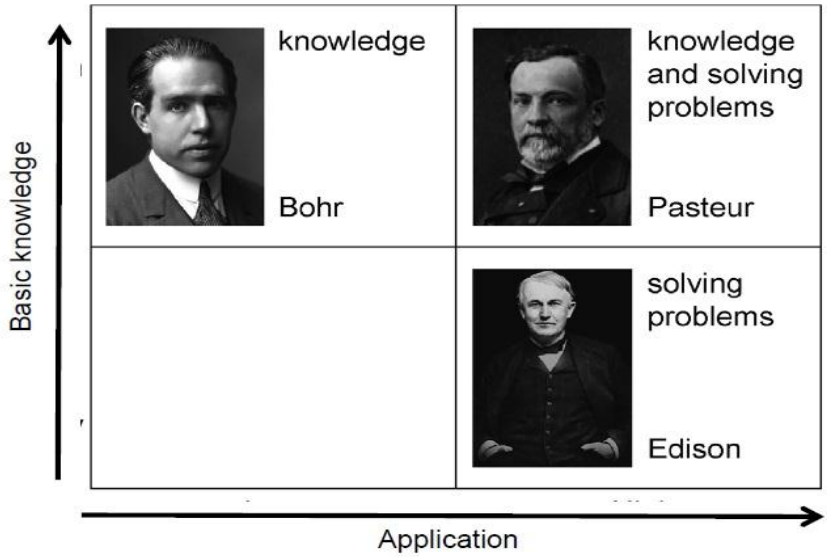
This is a time of sea change in all aspects of the human condition. Scientific disciplines, as we know them, are not exception. They too are undergoing major realignment and paradigm shift. Chemical enterprise in academia, industry and government faces the forefront of these waves of transformation. This talk focuses on how each sector of the enterprise adjusts, reorients and reinvents themselves in face of the demands for evolutionary transformation directions.

Chemistry in academic world is undergoing a major reinvention. Its interfaces with life science and materials technology are so extensive that its core discipline is almost obscured by the interfaces. Curiosity driven academic research is no longer extant, except a few remnant pockets. Industrial chemical research seems to survive only to cultivate technical acuity for the selection process of potential acquisitions, mostly of seeds of new technologies by academic startups. Government national laboratories are completely dominated by the potential for societal benefit, and its support for the academic research is driven likewise. I will review how we have reached to this stage and how it continues. The talk will conclude with my personal prognosis for the coming decades.



Prof. Hyuk Yu

Hyuk Yu is currently the Walter H. Stockmayer Professor Emeritus and the Eastman Kodak Professor Emeritus of Chemistry at the University of Wisconsin-Madison, who joined the Department in 1967, coming from then National Bureau of Standards (NBS), now called NIST. He received B.S. in chemical engineering from Seoul National University in Korea in 1955, M.S. in organic chemistry from University of Southern California and his Ph. D. in physical chemistry from Princeton in 1962 under the late Prof. Arthur V. Tobolsky. After a postdoctoral stint of one year and half year at Dartmouth College with the late Prof. Walter H. Stockmayer, he joined the Polymers Division of NBS in Washington, stayed there for 4 years before moving to Madison. During his active teaching/research career at Wisconsin in 1967-2004, he supervised about 50 Ph.D. students, some jointly with colleagues, and sponsored about 25 postdoctoral research associates and visiting professors. His research specialty is in the area of dynamics of polymers in solution, bulk and gels, and on interfaces. He has been recognized for the contributions in these areas, with the US Department of Commerce Merit Award at the National Bureau of Standards in 1966, the John Simon Guggenheim Fellowship in 1984, the Alexander von Humboldt Research Award in 1992, the High Polymer Physics Prize of American Physical Society in 1994, the Ho-Am Basic Science Prize of Ho-Am/Samsung Foundation of Korea in 1997, the Distinguished Services to Polymer Science Award (Kobunshi Koseki Sho) of the Society of Polymer Science-Japan in 1997, Langmuir Lecture Prize of the Division of Colloid & Surface Chemistry of American Chemical Society in 1999, and the Industry-University Collaboration Award of the LG Corporation of Korea in 2003. He was engaged in teaching a wide range of undergraduate and graduate courses at Wisconsin, from general chemistry to polymer rheology. His excellence in teaching was recognized by his peers, receiving the Pharmacia-Upjohn Award of Excellence in Teaching of Chemistry in 1999. He had in the meantime been a technical consultant to the Research Laboratories of Eastman Kodak Company for 35 years, 1968-2003, the Polymers Division of NIST for 30 years, 1967-1997, and Eastman Chemical Company of Kingsport, TN for 24 years, 1976-2000. Since his formal retirement on 2004, he has been active in technical consulting for chemical industry and government sponsored laboratories in Korea, and teaching at various venues such as Pohang University of Science & Technology in Korea, LSU in Baton Rouge, Louisiana, Tokyo Institute of Technology and Kyushu University in Japan.

“Photomobile Polymer Materials: Structures and Functions”

Prof. Tomiki Ikeda

Research & Development Initiative,
Chuo University

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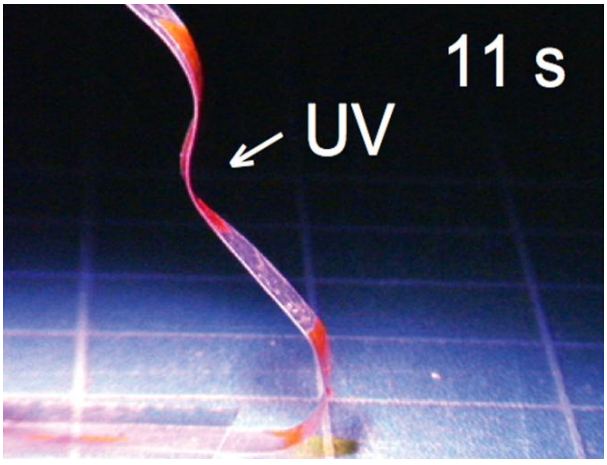
Crosslinked liquid-crystalline polymers (CLCPs) are a class of materials that show macroscopic deformation in response to actinic light [1]. In these materials, the alignment of LC molecules (mesogens) is strongly coupled with a conformation of a single polymer chain as well as a macroscopic shape of the material. Upon exposure to light to disorganize the alignment of mesogens, deformation of the material occurs. CLCPs as photomobile polymer materials have been intensively investigated due to their large photomechanical effects, which have enabled the fabrication of unique devices such as motors [2], inch worm [3] and robotic arms [3]. In this presentation, I will show how the structures affect the functions and performance of the photomobile materials.

References

[1] T. Ube, T. Ikeda, *Angew. Chem. Int. Ed.* **53**, 10290 (2014). [2] M. Yamada *et al.*, *Angew. Chem. Int. Ed.* **47**, 4986 (2008). [3] M. Yamada *et al.*, *J. Mater. Chem.* **19**, 60, 2009.

Light-driven plastic motor



Light-driven robotic arm

Prof. Tomiki Ikeda

Education

BS Department of Polymer Chemistry, Kyoto University (1973)
MS Department of Polymer Chemistry, Kyoto University (1975)
Ph. D Department of Polymer Chemistry, Kyoto University (1978)

Appointment

1978-1981 Postdoctoral Research Fellow, University of Liverpool, UK
1981-1986 Research Associate, Tokyo Institute of Technology, Japan
1986-1992 Assistant Professor, Tokyo Institute of Technology, Japan
1992-1994 Associate Professor, Tokyo Institute of Technology, Japan
1994-2010 Professor, Tokyo Institute of Technology, Japan
2009-2010 Director, Chemical Resources Laboratory, Tokyo Institute of Technology
2011- Professor, Chuo University
2016- Professor, Chinese Academy of Sciences

Academic Activities

Vice-President, Japanese Liquid Crystal Society, 2003, 2009, 2010
Vice-President, the Chemical Society of Japan, 2005
Head Vice-President, the Chemical Society of Japan, 2006
Fellow, Royal Society of Chemistry (FRSC), UK, 2014-
Associate Editor, Journal of Materials Chemistry (RSC, UK), 2006-2010
Advisory Board Member, Journal of Materials Chemistry (RSC, UK), 2011-

Awards

The Award of the Japanese Liquid Crystal Society, 1999
The Award of the Society of Polymer Science, Japan, 2003
The Chemical Society of Japan Award, 2009

“Artificial Lighting for Plant Production in Vertical Farming”

Prof. Changhoo Chun

Department of Plant Science,
Seoul National University

E-mail : changhoo@snu.ac.kr

In the next few decades, urban agriculture and vertical farming will play important roles not only as modified forms of existing agriculture and farming practices. The term ‘Plant factory with artificial lighting (PFAL)’ refers to a plant production facility with a thermally insulated and nearly airtight warehouse-like structure. Multiple culture shelves with electric lamps on each shelf are vertically stacked inside. Other necessary equipment and devices for a PFAL are air conditioners, air circulation fans, CO2 and nutrient solution supply units, and an environmental control unit. Light emitting diode (LED) lamps are now attracting great attention in industry and among researchers replacing fluorescent lamps that have been previously used in PFALs for a few decades. PFAL will provide entirely new social services in urban areas which are facing ecological, economic, and social constraints. The speaker will introduce several successful cases of PFAL-businesses in Korea and Japan. Major challenges to be solved including high initial and production costs and some criticisms of PFALs will also be answered. With intensives researches and accumulation of operational and management experiences, the production costs of plants in PFALs are decreasing every year. And additional PFAL challenges such as culture information, optimal environmental control strategy, and marketing of produce for various types of crops have been gradually resolved.

Prof. Changhoo Chun

Education

Ph.D. The University of Tokyo, Japan Agricultural Engineering 1994
M.S. Seoul National University, Korea Horticultural Science 1989
B.S. Seoul National University, Korea Horticultural Science 1989

Professional Experience

2013-present Professor of Horticulture, Seoul National University, Korea
2007-2013 Associate Professor of Horticulture, Seoul National University, Korea
2003-2007 Assistant Professor of Horticulture, Seoul National University, Korea
2001-2003 Associate Professor of Horticulture, Chiba University, Japan
1997-2000 Assistant Professor of Horticulture, Chiba University, Japan
1994-1997 Postdoctoral Researcher, Purdue University, USA.
1987-1989 Assist, Seoul National University, Korea

2015-present Senator, Seoul national University, Korea
2015-present Director General, SNU Bio Venture Valley, Seoul national University, Korea
2013-2015 Associate Dean, College of Agriculture and Life Sciences, Seoul National University, Korea
2012-present Adjunct Associate Professor, Chiba University, Japan
2012-present Adjunct Senior Researcher, National Horticultural Research Institute, Rural Development Administration (RDA), Korea
2011-2013 Director General, SNU Bio Venture Valley, Seoul national University, Korea
2009-2010 Visiting Professor, Purdue University, USA.
2004-2008 Adjunct Senior Researcher, National Horticultural Research Institute, RDA, Korea
2001-2003 Adjunct Senior Researcher, National Honam Agricultural Experiment Station, RDA, Korea

“White OLEDs for Displays and General Lighting”

Prof. Junji Kido

Research Center for Organic Electronics,
Department of Organic Device Engineering
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In 1993, we have developed white-light-emitting OLEDs for the first time. Since then, the performance of white OLEDs have been steadily improved and, today, they are considered to be the light source of the next generation. OLED displays based on white OLEDs have also been developed and large-size displays have been commercialized. Recently, high quantum efficiencies (QEs) can be obtained by using phosphorescent emitters such as iridium complexes. External QE of 25—30% was achieved for blue, green and red OLEDs, which correspond to the internal QE of nearly 100%. Device lifetime at high luminance levels, which is required for general lighting, has been significantly improved by using the multiphoton structure. By combining the above techniques, OLEDs can be extremely efficient and possess extremely long lifetime, even at high luminance level. In 2010, Lumiotec Inc. has started small-scale production of white OLED panels in Yonezawa, and luminaires using their panels have been commercialized. In this talk, recent progress in white OLED will be discussed.

Prof. Junji Kido

Prof. Kido has received his B.S. degree in applied chemistry from Waseda University, Tokyo, Japan, in 1984 and the M.S. and Ph. D. degrees in polymer chemistry from Polytechnic University, New York, in 1987 and 1989, respectively.

In 1989, he joined the department of polymer chemistry in Yamagata University in Japan as an assistant professor and promoted to an associate professor in 1995, to a full professor in 2002, and to a distinguished research professor in 2011. From 1990 to 1992, he was associated as a research scientist in Brookhaven National Laboratory. He was appointed as the General Director for "Research Institute for Organic Electronics" founded by the Yamagata prefectural government from 2003 to 2010. He also served as the project leader for the Japanese national projects on "Advanced Organic Semiconductor Devices" from 2002 to 2007 and "Organic Lighting" since 2004 both sponsored by METI (Ministry of Economy, Trade and Industry).

His current research activities are focused on organic light-emitting devices (OLEDs). He invented white-light-emitting OLEDs in 1993 for the first time and continuously working on developing high performance OLEDs. Wall Street Journal (May 10, 1995) cited his work entitled "Japanese Light Researcher May Turn LED into Gold". He is a co-founder of "Lumiotec Inc." to manufacture white OLED panels for general lighting applications. He has also founded "Organic Lighting Corporation" to manufacture OLED lighting fixtures in 2009.

His work has been recognized by awards from the Society of Polymer Science, Japan (Society Award) and the Society for Information Display, U.S.A. (Special Recognition Award) in 2002. He also received the Herman F. Mark Technology Medal from Polytechnic University, USA, (2007) and the Fellow Award from Society for Information Display, USA, (2008). In 2013, He received the Medal with Purple Ribbon from Japanese Emperor. Recently, he received the Karl Ferdinand Braun Prize from the Society for information Display, USA which is awarded for "Outstanding Technical Achievement in, or Contribution to, Display Technology."

“Outlook on Flat Panel Display Industry, LCD or OLED?”

Yasuo Nakane

Mizuho Securities Ltd. (Tokyo Japan)
Senior Director, Global Head of Technology Research, Senior Analyst

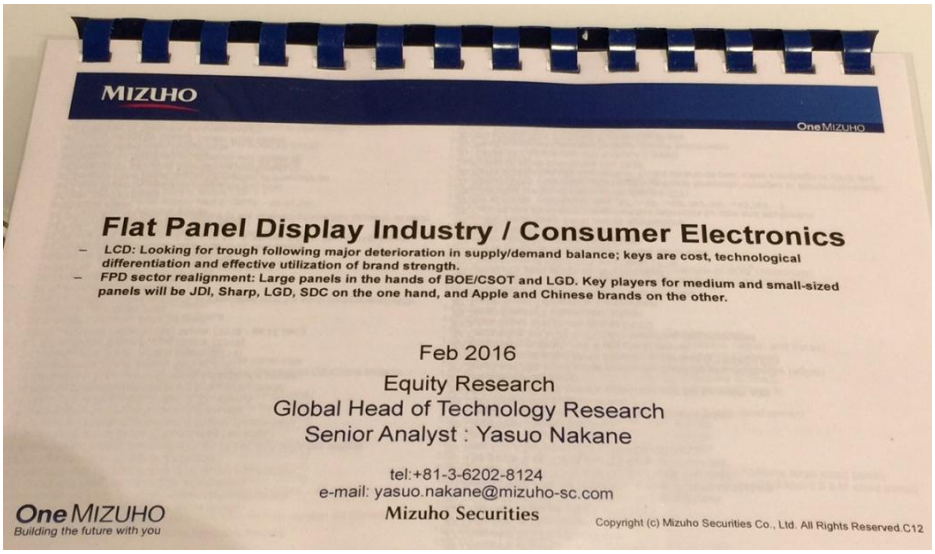
E-mail : Nakaneyasuo0222@gmail.com

The flat panel display industry is now at a big turning point. Smartphones and tablets are saturating the market.

TV sets have no hope of growth in terms of volume, with a sole hope of growth in screen size. On the other hand, Chinese panel manufactures are still making capital investments aggressively with the backing of local governments.

What is interesting is that trend toward OLEDs (organic light emitting diodes) is taking shape regardless of screen size, large or medium-to-small. In the big-screen segment, even Korean manufacturers have given up capital investment games and are, by making a shift to OLEDs chiefly for use as TV panels, aiming at achieving technological differentiation from their Chinese competition.

In the mid-to-small-sized screen segment, since Apple is pressing ahead with the adoption of OLEDs on its iPhones, not only Samsung Display but also others are quickly picking up the tempo. With the abovementioned issues taken into account, the presentation will discuss the future direction of the flat panel display industry as a whole.



Yasuo Nakane

Education

Mar 1995-Mar 1996	National Taiwan Normal University (Taipei) Studied Mandarin
Apr 1987-Mar 1991	Sophia university(Tokyo) International law(Bachelor)

Employment History

Aug 2015-Present	Mizuho Securities Ltd. Senior Director, Global Head of Technology Research, Senior Analyst ; Cover Consumer Electronics sector in Japan such as Sony, Panasonic, Sharp etc. also will co-cover Taiwanese technology companies as well. Cover Flat Panel Display industry and its whole value chain from materials, equipment, panels and applications. Understand tech hardware supply chain across the Asia, especially in Taiwan, China and Korea. Global head of Technology research, managing a team of 15people in Tokyo, Hongkong and Taipei. Have a webpage in Nikkei BP Semiconductor research, and contribute industry reports to them.
Sep 2001-Jul 2015	Deutsche Securities Inc. Managing Director, Head of Japan technology research, Senior Analyst
Apr 1991-Aug 2001	Daiwa Institute of Research Co. Ltd Manager, Vice representative of Taipei branch ; Jul 1997-Aug 2001, worked in Taipei as Senior analyst, Vice representative of Taipei branch.

“Designed Chemical Synthesis and Assembly of Uniform-sized Nanoparticles for Medical and Energy Applications”

Prof. Taeghwan Hyeon

Center for Nanoparticle Research,
Institute for Basic Science (IBS),
School of Chemical and Biological Engineering,
Seoul National University

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Over the last 10 years, our laboratory has focused on the designed chemical synthesis, assembly and applications of uniform-sized nanocrystals. In particular, we developed a novel generalized procedure called as the “heat-up process” for the direct synthesis of uniform-sized nanocrystals of many metals, oxides, and chalcogenides.

Recently our group has been focused on medical applications of various uniform-sized nanoparticles. Using 3 nm-sized iron oxide nanoparticles, new non-toxic MRI contrast agent was realized for high resolution MRI of blood vessels down to 0.2 mm. We fabricated tumor pH-sensitive magnetic nanogrenades composed of self-assembled iron oxide nanoparticles and pH-responsive ligands for theranostic application, enabling the visualization of small tumors of < 3 mm via pH-responsive T1 MRI and fluorescence imaging and superior photodynamic therapeutic efficacy in highly drug-resistant heterogeneous tumors.

We reported large-scale synthesis of magnetite nanocrystals imbedded in a carbon matrix. We demonstrated galvanic replacement reactions in metal oxide nanocrystals. When Mn_3O_4 nanocrystals were reacted with iron(II) perchlorate, hollow box-shaped nanocrystals of $Mn_3O_4/\gamma\text{-}Fe_2O_3$ were produced. These iron oxide-based nanomaterials exhibited very high specific capacity and good cyclability for lithium ion battery anodes. We report a simple synthetic method of carbon-based hybrid cellular nanosheets loaded with SnO_2 nanoparticles. The resulting SnO_2-carbon nanosheets exhibit specific capacity of 914 mAh g^{-1} with the retention of 97.0% during 300 cycles, and the reversible capacity is decreased by only 20% as the current density is increased from 200 mA g^{-1} to 3000 mA g^{-1}.

We present a synthesis of highly durable and active intermetallic ordered face-centered tetragonal (fct)-PtFe nanoparticles (NPs) coated with “dual purpose” N-doped carbon shell. Our ordered fct-PtFe/C nanocatalyst coated with N-doped carbon shell shows 11.4 times-higher mass activity and 10.5 times-higher specific activity than commercial Pt/C catalyst. Moreover, we accomplished the long-term stability in membrane electrode assembly (MEA) for 100 hr without significant activity loss.

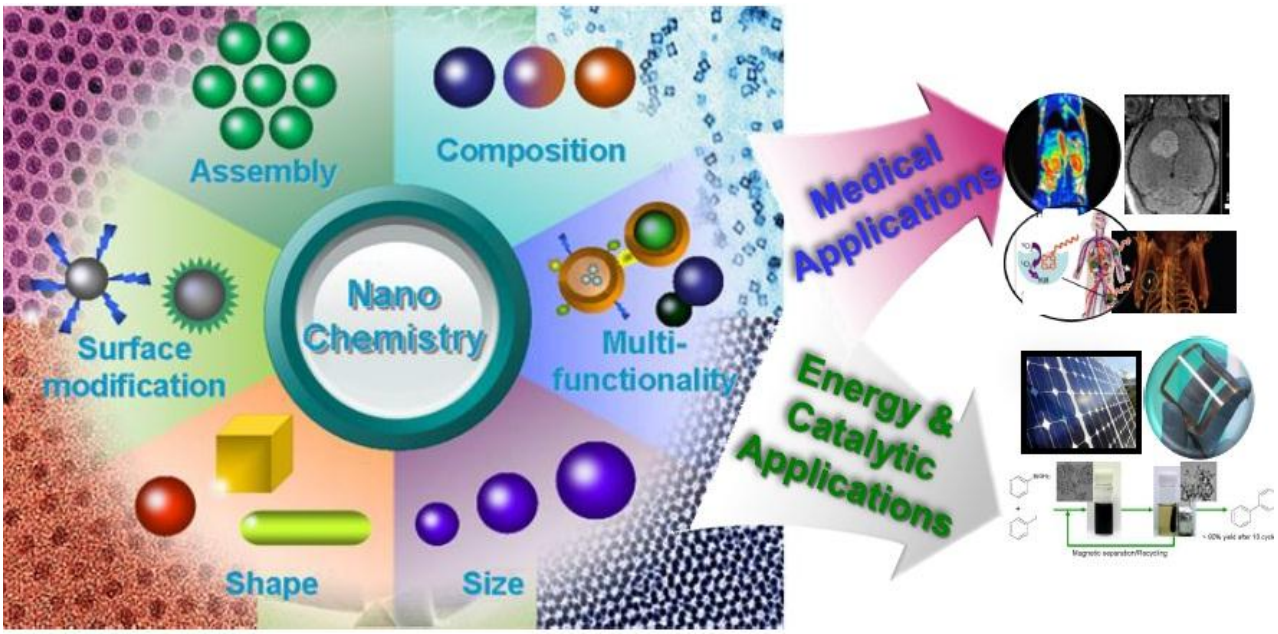
Prof. Taeghwan Hyeon

Educational Background

1) B. S., Seoul National University, Chemistry, 1987
2) M. S., Seoul National University, Chemistry, 1989
3) Ph. D., University of Illinois at Urbana-Champaign, Inorganic Chemistry, 1996: Advisor: Kenneth S. Suslick, Nanostructured Catalytic and Magnetic Materials: Sonochemical Synthesis and Characterization.

Professional Experienece

2012.08-	Director, Center for Nanoparticle Research, Institute for Basic Science (IBS)
2010-	Associate Editor, J. Am. Chem. Soc.
2011-	SNU Distinguished Fellow (Distinguished University Professor)
2014.12-	Member, Presidential Advisory Council on Science and Technology
2002-2010	Director, National Creative Research Center for Oxide Nanocrystalline Materials
1997.09-	Professor, Associate Professor, Assistant Professor, School of Chemical and Biological Engineering, Seoul National University
1996-1997	Postdoctoral Fellow, Northwestern University, Catalysis Center
1990-1991	Coordinator for general chemistry laboratory, Seoul National University
1989-1990	Coordinator for general chemistry laboratory, POSTECH

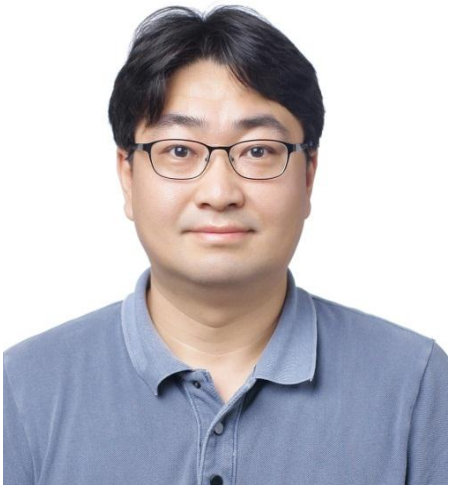


“High-Density DNA Brushes on Polymer Particles for Building Up Colloidal Superstructures”

Prof. Gi-Ra Yi

School of Chemical Engineering,
Sungkyunkwan University

E-mail : yigira@skku.edu



Brownian motion can drive the self-assembly of colloidal particles into a wide variety of structures without external energy if the interparticle potentials are appropriately designed. In recent years, grafting DNA with complementary single-stranded sticky ends to colloid surfaces has emerged as a powerful tool for programming highly specific interparticle potentials, leading to a variety of new colloidal crystals and functional self-assembled structures including meta-materials, photonic crystals, plasmonic circuits and so on. However, for relatively large core particles with short DNA brushes, it requires high density DNA coatings to assemble them into certain target structures because lots of defects are inevitably formed at early stage and can be cured by rearrangement only with high density DNA coatings. Here, high-density DNA coated colloidal particles are prepared which can be used for DNA-mediated self-assembly of single- and multiple-component colloidal crystals. First, an amphiphilic diblock copolymer is modified which consists of a hydrophobic polystyrene (PS) block and a hydrophilic poly(ethylene oxide) (PEO) block with azide functional groups at the end (poly(ethylene oxide)-N3). Then, the diblock copolymers are introduced into an aqueous suspension of colloidal polymer particles swollen with a solvent. The hydrophobic PS anchoring block is incorporated into the swollen polymer spheres and physically trapped when the solvent is removed, resulting in a dense PEO polymer brush with azide functional end groups. Finally, single-stranded DNA strands with sticky ends are attached to the azide groups using strain-promoted azide–alkyne cycloaddition (SPAAC, a copper-free click chemistry). This procedure results in a high areal coverage of more than 200 000 DNA strands on 1-μm-diameter particles. The ssDNA-coated particles with sticky ends can readily form either face-centered-cubic (fcc) or cesium chloride (CsCl) crystal structures when annealed just below the melting temperature of the DNA-coated particles. Finally, we have demonstrated site selective coating of DNA onto hybrid mono-patchy particles of polystyrene and organosilica and then various colloidal superstructures.

Prof. Gi-Ra Yi

Education

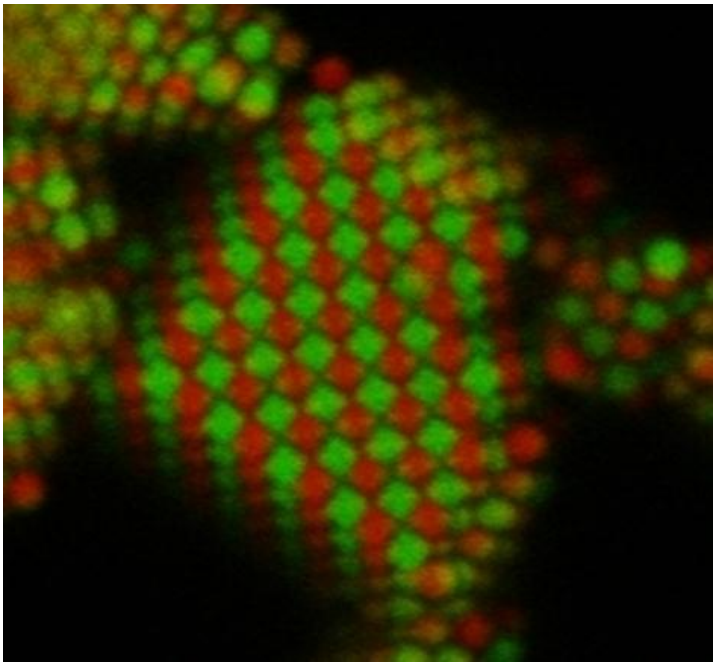
BS Chemical Engineering, Yonsei University (Seoul, Korea) (1997)
MS Chemical Engineering, KAIST (1999)
Ph.D. Chemical Engineering, KAIST (2003)

Professional Appointments

2003.3-2004.2	Postdoc, Chemicsl Engineering, UC Santa Barbara
2004.2-2006.7	Senior Researcher, LG Chem Research Park
2006.7-2009.8	Senior Researcher, Korea Basic Science Institute, Daejeon
2009.9-2012.3	Assistant Professor, Chungbuk National University, Cheongju, Chungbuk
2015.2-2015.8	Visiting Professor, Physics Department, New York University, New York, USA
2012.3-present	Associate Professor, Sungkyunkwan University, Suwon, Gyeonggi

Honors and Awards

2015 Outstanding Professor Award (School of Engineering, Sungkyunkwan University)
2008 Best Research Scientist Award (Korea Research Council of Fundamental Science & Technology)



“Imperceptible sheet-type sensors for cyber–physical systems”

Prof. Tsuyoshi Sekitani

The Institute of Scientific and Industrial Research,
Osaka University

E-mail: sekitani@sanken.osaka-u.ac.jp

In this talk, I will discuss the recent progresses and future prospects of large-area, ultra flexible, and ultrathin electronic sensors. Our works focus on integration technologies of sheet-type, large-area electronics comprising thin-film transistors (TFTs), wireless module, CPU, and thin-film battery manufactured on thin-film flexible polymeric plastic substrates, which are imperceptible active matrix sensors. Here I would like to demonstrate the applications of imperceptible sensors for sophisticated wearable electronics and real-time health monitoring of civil infrastructures. These sensors serve as an important part of seamless cyberspace/real-world interfaces that are commonly referred to as cyber physical systems (CPSs).

A CPS consists of collaborating computational elements in cyberspace and physical entities in real space, and involves physical sensing (data collection), data transmission and processing, and actuation between cyber and real spaces. The CPS aims to make every social system efficient and optimized. First-generation CPSs can be used in areas as diverse as home security, automotive systems, civil infrastructure, energy, agriculture, healthcare, manufacturing, transportation, robotics, and consumer electronics. Imperceptible electronic sensors are expected to play an increasingly important role in the development of large-area two-dimensional interfaces for collecting physical data in a CPS.

Prof. Tsuyoshi Sekitani

Tsuyoshi Sekitani received the B.S. degree from Osaka University, Japan in 1999, and the Ph.D. degree in applied physics from the University of Tokyo, Japan in 2003. From 1999 to 2003, he was with the Institute for Solid State Physics, the University of Tokyo. From 2003 to 2010, he was a Research Associate, and in 2011, he was an Associate Professor in the School of Engineering at the University of Tokyo. In 2014, he was made a Professor in The Institute of Scientific and Industrial Research at Osaka University. His current research interests include organic transistors, flexible electronics, plastic integrated circuits, large-area sensors, and plastic actuators. He is a member of the Japanese Society of Applied Physics (JSAP) and the Materials Research Society (MRS). He received more than 20 awards including the Paul Rappaport Award in 2009 and 2010 (the Best paper of the IEEE Trans. Electron Devices in 2009 and 2010). In 2014, he was awarded as “Highly Cited Researchers” from THOMSON REUTERS.