

Center for Promotion of Advanced Interdisciplinary Research Seminar

Frontiers in Molecular Thermoelectricity and Chemical Plasmonics

Date	Tuesday, June 30, 2026
Time	15:10–17:00
Venue	Seminar Room, International Building, Graduate School of Engineering Science, The University of Osaka (基礎工学研究科国際棟セミナー室)

This seminar will feature two leading researchers from Korea University and Seoul National University, who will present recent advances in molecular thermoelectricity and plasmonic nanomaterials.

In addition, both speakers serve as editors of ACS journals. They will share their perspectives on recent trends in manuscript submissions, as well as practical advice for improving the quality and impact of research papers.

Topics and Speakers

<p>“Molecular Thermoelectricity”</p> <p>Professor Hyo Jae Yoon Korea University</p> <ul style="list-style-type: none">• Department Chair• Director, Chemistry Graduate Program• Director, Center for Advanced Molecular Science• Vice Director, Brain Korea 21 Center for Chemistry• Associate Editor, ACS Applied Nano Materials	<p>“Chemical Plasmonics with Metal Nanoparticles”</p> <p>Professor Jwa-Min Nam Seoul National University</p> <ul style="list-style-type: none">• Vice Dean for Planning and Public Relations• Director, SNU Science Outreach Center• Senior Editor, Accounts of Chemical Research
--	--

Organizer: Center for Promotion of Advanced Interdisciplinary Research (C-Pair)
Graduate School of Engineering Science

Co-organizer: Interactive Materials Science Cadet Program, The University of Osaka

Contact: Hirokazu TADA, Professor, Division of Frontier Materials Science,
Graduate School of Engineering Science
tada.hirokazu.es@osaka-u.ac.jp

Coffee and tea will be available. Please bring your own mug to help reduce waste.

Molecular Thermoelectricity

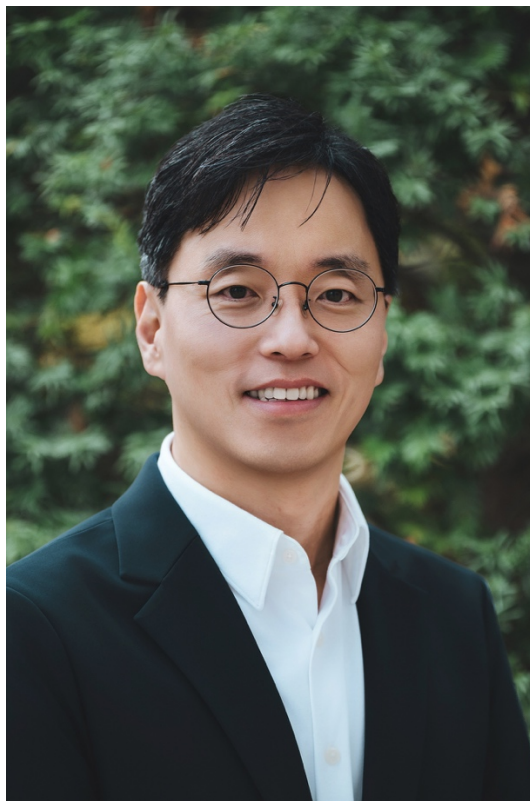
Hyo Jae Yoon*

Department of Chemistry, Korea University, Seoul, 02841, Korea

hyoon@korea.ac.kr

The field of molecular thermoelectricity focuses on the Seebeck effect occurring in electrode-molecule-electrode junction. The field is of fundamental interest to study structure-thermopower relationship at the atomic level and develop nanoscale thermoelectric devices. Research in molecular thermoelectricity is highly challenging. This is because, among others, i) heat can dissipate in an uncontrollable manner through nearly all matters, ii) it is difficult to create and define reliably temperature differentials across ~ 1 nm gap, iii) organic molecules may undergo thermal degradation, iv) it is non-trivial to connect soft, floppy organic molecules with hard electrodes in a non-invasive manner with reproducibility, and v) charges move in a quantum-mechanical regime. This presentation will discuss our recent efforts in the field of molecular thermoelectricity. We have developed a new metrology technique for reliably measuring Seebeck coefficient over molecular monolayers. Using this technique, we have begun to probe how thermopower is related to the structure of molecule and how to enhance the thermoelectric performance of molecular-scale device in a quantum-tunneling regime.

Short Bio



Professor Hyo Jae Yoon earned his B.Sc. in Chemistry from Sogang University, Korea, in 2005 and subsequently completed his Ph.D. in Supramolecular Chemistry at Northwestern University, USA, in 2010 under the supervision of Professor Chad A. Mirkin. From 2010 to 2014, he pursued postdoctoral research at Harvard University, USA, under the mentorship of Professor George M. Whitesides. Currently, Professor Yoon is a full professor, department chair, graduate program director, and vice-director of BK21 Center in the Department of Chemistry at Korea University, Seoul, Korea. Professor Yoon has received several honors, including recognition as an IUPAC Young Chemist Travel Awardee, a Young Investigator Fellow of the POSCO Chung-Am Science Foundation, a recipient of the Research Achievement Award from the Korean Ministry of Education, the KU Granite Research Award, and the S-OIL Next-Generation Scientist Award (bestowed by the Korean Academy of Science and Technology, KAST). He is also a member of the Young Korean Academy of Science and Technology (Y-KAST) and serves as an executive committee member of the natural sciences division of Y-KAST. In addition to his academic roles, Professor Yoon is an associate editor for *ACS Applied Nano Materials*. His current research focuses on organometallic chemistry, supramolecular electronics, molecular energy conversion, and interface reactions.

Chemical Plasmonics with Metal Nanoparticles

Jwa-Min Nam*

Department of Chemistry, Seoul National University, Seoul, South Korea

E-mail: jmnam@snu.ac.kr

Plasmonics deals with understanding and manipulating the interaction between light and matter at a scale that is significantly smaller than the wavelength of light (e.g., metal nanoparticles), and chemical nanoplasmonics is mainly about the study and use of nanoscale chemistry for advancing plasmonics and the use of plasmonics to address key issues and challenges in chemistry and other related fields. Designing, synthesizing and controlling metal nanostructures with a superhigh precision for a large number of structures are the keys to the reliable and widespread use of plasmonic nanostructures in chemistry, materials science, optics, nanoscience, biotechnology and medicine. Here, I will share the design, synthetic strategies and characterization results of molecularly tunable and structurally precise and reproducible plasmonic nanostructures including metal nanogap structures, multi-component metal nanoparticles, mechanically interlocked nanostructures including gold nanocatenanes and nanorotaxanes and nanocube-assembled supercrystals with strong, controllable and quantifiable plasmonic signals (e.g., plasmonic nanogap-enhanced Raman scattering). I will then show their potential in addressing some of important challenges in plasmonics, materials science and biotechnology, and discuss how these new plasmonic materials and platforms can lead us to new breakthroughs in nanochemistry, nanophotonics, next-generation disease diagnostics, molecular computing and nanomachines/nanorobotics.



Jwa-Min Nam
Department of Chemistry
jmnam@snu.ac.kr

Jwa-Min Nam received his Ph.D. degree in chemistry from Northwestern University (Chad Mirkin & Mark Ratner) (2004) and worked as a postdoctoral fellow at the University of California, Berkeley (Jay Groves) (2004-2005). Dr. Nam started his independent career as an assistant professor at Department of Chemistry, Seoul National University in 2006. He is currently a full Professor in Chemistry and an Adjunct Professor in Biological Sciences at Seoul National University. He is serving as the Vice Dean (Planning & Public Relations) of College of Natural Sciences, Seoul National University and the Director, SNU Science Outreach Center.

He has been elected as a Fellow of the Korean Academy of Science and Technology (KAST) (2024). Jwa-Min Nam won many awards including Victor K. LaMer Award, American Chemical Society (2006), Presidential Young Scientist Award, President of the Republic of Korea (2012), SNU Excellence in Research Award, the President, Seoul National University (2021) and the Basic Science Award, the Ministry of Science and ICT, South Korea (2022).

He is currently serving as a Senior Editor of *Accounts of Chemical Research* (ACS Publications) (2025-Current). He served as an Associate Editor (2020-2023) and an Executive Editor (2024) of *Nano Letters* (ACS Publications). He is on the editorial advisory board of *ACS Central Science* (ACS Publications), *Small Methods* (Wiley-VCH), *Particle and Particle Systems Characterization* (Wiley-VCH), *Journal of Nanobiotechnology* (BMC) and *Sensors & Diagnostics* (Royal Society of Chemistry).

Jwa-Min's research interests include plasmonic nanoparticles, surface-enhanced spectroscopy, nanobiosensors, nanobiocomputing, nanomachines and nanoparticle-based therapeutics.