



Miraculous Chemistry on the Han River

Almost a year ago, we were delighted when Jwa-Min Nam of Seoul National University approached our editorial board and asked whether we would like to collaborate on a symposium for the 2017 Spring Korean Chemical Society meeting. The idea was to pair talks from our Editors with those from top Korean scientists along one or two key themes. We were eager to partner with KCS, and curious as to how such an event would play out and be received. Having held our first KCS–ACS joint symposium last month, I can now say it was an extraordinary success and has deepened our ties to a fellow society in just a few short days.

South Korea is the perfect setting to focus on the rapid advancements possible in chemistry. There truly is no other culture or economy that has blasted forward in the way South Korea has since the 1960s. In that time, the GDP has increased by more than 2000%, taking South Korea from a country in the bottom half of GDP rankings to just outside the top 10 world economies in only a few generations. So steady and strong is the country's growth (only 2 years in the past 60 have not posted year-on-year growth while almost a dozen others have had double digit percent gains) that it is sometimes called the "Miracle on the Han River". As we drove along that namesake with both gleaming water and skyscrapers as far as the eye can see, the title appeared very apt. Much of the growth has been tech-oriented, and chemistry has played a central role, especially in the advancement of consumer electronics, where Korean brands will soon corner the market on LCD displays.

It is thus fitting that our events here started at Seoul National University, a beautiful mountainous campus, home to nearly twenty-five thousand students and five thousand faculty and staff. The main campus was opened in 1975 on land that once housed the Samsung CEO's golf course. Managing Editor Miranda Paley spent the day introducing students and faculty to the journal, and sitting down with faculty to discuss their novel research. The next day, Miranda and Senior Editorial Board member Chris Chang (UC Berkeley) held an ACS-on-Campus event at the Korean Institute for Science & Technology, talking to students about how to prepare their manuscripts and the ins-and-outs of peer review. Chris's presentation focused on the way his lab approaches paper writing—starting with a strong and

detailed outline, for example—which was particularly well received. By design, he did not even pass out the outline slide, going over the process in general and letting student questions guide the discussion. We hope to see some of their papers submitted to the journal in the coming years.

The day of the symposium arrived, and we fueled up on dumplings and noodles—if only all convention centers provided such sustenance! The first session was called Chemistry for Next Generation Life Sciences. After opening remarks from the KCS President, I started things off with a talk highlighting recent work in my lab using trehalose analogues to improve TB diagnostics, particularly in the context of resource-poor environments where few diagnostic technologies translate effectively.

Next was Taeghwan Hyeon from Seoul National University and IBS. He dazzled the audience with numerous examples of designer nanoparticles, each uniquely suited for applications in displays, sensors, and exquisitely sensitive MRI contrast agents. Taeghwan was followed by Juyoung Yoon from Ewha Womans University, who highlighted many creative fluorescence probes his lab has developed. Their ability to detect and report on reactive oxygen species including HOCl represents an important step forward.

Finally, closing out the first session was Senior Editorial Board member Cristina Nevado (University of Zurich), who is an uncontestable champion for—her flight having been canceled—changing itineraries and arriving in Korea only 2 hours before her incredible talk on difunctionalizing alkenes and alkynes. Beyond a meticulous eye to mechanism and reaction design, her work is also carefully crafted toward enabling the eventual syntheses of important biologically active compounds.

The second session focused on chemistry's centrality in the development of materials suited to answer society's challenges, and specifically how the rational design of substructures is a crucial component of engineering function. The first speaker, Joon Won Park from POSTECH, is also chair of KCS's Division of International Cooperation and was instrumental in helping us organize our symposium. His lecture was a master class in dendrimer self-assembly and patterning as a means to directly quantify biomarkers using

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atomic force microscopy. Our next editor talk came from Senior Editorial Board member Dongyuan Zhao (Fudan University), who gave his as-always insightful take on mesoporous silicon materials, guiding the audience through a gallery of different core–shell, hollow, and Janus nanoparticles, each with their own properties.

Jwa-Min Nam taught us how to engineer materials that engage in plasmon resonance, including the design of “cube-in-cube” nanostructures that give strong plasmonic signals in biological systems without the need for organic dyes. He explained that that sub-nanometer gaps between metal components are necessary to give the best Raman spectral signals, but if the gap is too small, quantum tunneling becomes a problem.

The final editor speaker was Chris Chang, who convinced us that copper, although often thought of as a redox metal, can also have biological signaling functions akin to the metals on the “left side” of the periodic table such as sodium and potassium. He also showed how tools for real-time imaging of copper species can shed light on neuronal circuitry.

Lastly, closing out our symposium as well as the whole of the Korean Chemical Society meeting, Kinmoon Kim (POSTECH and IBS) spoke on engineered macromolecular interactors that could finally beat and replace the biotin streptavidin system. For chemical biologists like myself, who have struggled with biotin–streptavidin capture probes, these new host–guest pairs are a beacon of light.

We walked out of our symposium to an almost empty building, with the other sessions having ended earlier while the sun set on the massive KINTEX convention center. It truly is a testament to the dedication of these students and professors that so many stayed until dinner time on a Friday night in order to share our science.

Following the sessions, our hosts braved the considerable Seoul evening traffic to deliver us safely to our hotel, where we had an amazing dinner highlighting cuisine from not just Korea but all across Asia, along with several toasts, cheers, and much goodwill. We hope to continue to collaborate with the Korean Chemical Society in the future, and to take our Editors’ Roadshow to other countries and their chemical societies too.

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Notes

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