School of Materials Science and Engineering Il Hyung Choi and Jun Ho Hwang received the best and the excellent thesis presentation awards from the Korean Polymer Association

- Student Il Hyung Choi, developed an anti-freezing nano-preservative that mimics the anti-freezing protein of polar organisms
- Student Jun Ho Hwang, Investigation of nanoparticle formation process by polymer polymerization using real-time transmission electron microscopy

▲ (from left) School of Materials Science and Engineering students Il Hyung Choi and Jun Ho Hwang received the best thesis presentation award at the 2022 Fall Conference of the Korean Polymer Society

GIST (Gwangju Institute of Science and Technology, President Kiseon Kim), School of Materials Science and Engineering Il Hyung Choi and Jun Ho Hwang (advisor: Professor Eunji Lee) won the Best Paper Presentation Award and the Excellent Paper Presentation Award, respectively, at the Fall 2022 academic conference of the Korean Polymer Association.

In the integrated master's and doctoral course, student Il Hyung Choi presented a thesis on the topic of 'Development of a self-assembled peptide nanomaterial with excellent freezing control effect by mimicking the antifreeze protein of polar organisms' (paper title: Peptide polymeric nanotrackers for ice recrystallization inhibition activity) and received the Best Paper Presentation Award.

Ph.D. student Jun Ho Hwang 'Identified the growth process of one-dimensional nanoparticles according to the polymerization process of conductive polymers using real-time liquid transmission electron microscopy' (paper title: Direct observation of rod-coil amphiphile assembly and elongation in an aqueous solution by LP-TEM) and was awarded the Excellent Paper Presentation Award.

Il Hyung Choi's thesis, supported by the GIST-GTI commercialization research project, is based on the fact that existing antifreeze agents may cause toxicity when used for cell preservation, and therefore have many limitations in application. This is a study to develop a 'biocompatible self-assembled peptide antifreeze nanopreservative' by simulating the chemical and structural characteristics of cryoprotective proteins that exist in polar organisms.

By maximizing the binding site between the ice crystal surface and the peptide nano-agent, the ice recrystallization process was effectively inhibited during thawing of stem cells, thereby successfully preserving cells without biological defects. A related paper was recently published in ACS Applied Nano Materials (paper title: Gold Nanoparticle-Tethered Peptide Nanofbrils for Monitoring Ice Recrystallization Inhibition: Implications for Cryopreservation).

Student Jun Ho Hwang, supported by the Samsung Electronics Center for Future Development, irradiated the liquid phase with an electron beam to produce organic semiconductor nanoparticles with a systematic microstructure at the same time as polymerization, and conducted a study in which it was analyzed through a real-time transmission electron microscope.

The developed particle manufacturing method is a simple one-pot process that can produce particles at the same time as polymerization, and its importance was recognized in academic and industrial terms as it directly revealed that the molecular arrangement determined during particle formation can determine the charge transfer path.

Student Il Hyung Choi said, "I would like to thank my advisor and lab colleagues for receiving the Best Paper Presentation Award at the Polymer Society, which represents the research field. We will continue to strive to produce research results that can be recognized worldwide."

Student Jun Ho Hwang said, "The solution phase self-assembly process of organic molecules was directly demonstrated in the nanoscale domain, which drew attention from many researchers at the conference. In the future, I would like to directly unravel the microscopic behavior of molecules, such as the growth of nanoparticles, phase transitions, and interfacial reactions, which greatly affect the properties of materials."

Meanwhile, the Korean Polymer Society was established in 1976 to contribute to the development and dissemination of science and technology related to polymers, such as chemistry, physics, biology, and engineering, and to promote polymer science and polymer industry. It is an influential domestic academic conference that consists of members, and more than 1,000 graduate student papers are presented every year.

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