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## **GIST demonstrates fusion technology for industrial desalination and waste water treatment**

- GIST (President Kiseon Kim) Professor In S. Kim (Dean of the School of Earth Sciences and Environmental Engineering & Director of the Global Desalination Research Center) demonstrated fusion technology for industrial desalination and waste water treatment at the Yeosu Sewage Treatment Plant on April 16, 2019.
  - Professor In S. Kim has been conducting a research project for the National Knowledge Information System for the past five years since December 2014 on the 'development of pressurized reverse-osmosis fusion technology,' which resulted in the technology demonstration at the Yeosu Sewage Treatment Plant of an experimental facility with capacity for 1 ton of reverse-osmosis (20 tons of purified water).
- GIST's 'development of pressurized reverse-osmosis fusion technology' can increase an additional 210% of water production by applying a lower pressure of 4 bar or less to the currently existing reverse-osmosis process.

- Current reverse-osmosis processes used for seawater desalination has a production rate of 50% compared to the influent flow while using 4.0 kWh/ton of energy. However, the new process developed at GIST has a production rate of 90% compared to the influent flow while using 2.3 kWh/ton of energy.
- Currently, the Yeosu Industrial Complex is the largest comprehensive petrochemical complex in Korea and consumes 480,000 tons of water a day. In addition, the existing companies are planning to expand existing plants or construct new ones, but the supply of industrial water is not sufficient during the summer or droughts. The Korea Water Resources Corporation has requested the expansion of new facilities because the Yeosu Industrial Complex and businesses are expanding, requiring an additional 98,400 tons of water per day by 2021.
- In response, South Jeolla Province and Yeosu are considering various measures to supply industrial water. As part of the solution, GIST was approved in June 2018 to install and field test its development of pressurized reverse-osmosis fusion technology for desalination and sewage reclamation. The facility was established in November 2018 and has been successfully operating since that time.
- GIST Professor In S. Kim said, "Compared to conventional reverse-osmosis membrane seawater desalination processes, the new pressurized type reverse-osmosis process can increase the production quantity by more than 90% with a low energy consumption of 2.3 kWh/ton."
- By demonstrating the reverse-osmosis operation of the experimental facility, the results will be shared with South Jeolla Province, Yeosu, and Korea Water Resources Corporation. On-site verification of the facility should be completed around September 2019.

- This new technology is likely to be applied to industrial areas in Korea that lack sufficient water as well continued research and demonstrations with the Saline Water Conversion Corporation, which is a state-owned desalination company in Saudi Arabia, and the Desalination Technology Research Institute, which is also located in Saudi Arabia. This will help overseas export of domestic technology for use in industrial desalination.