환경부 보도자료 다시 대한민국! 새로운 출발의 나라

보도시점 2024. 12. 9.(월) 10:30 배포 2024. 12. 9.(월)

Success in Domestic Production of Ultra Pure Water, the Lifeblood of Semiconductors... Supply Ceremony for Demonstration Plant Held

- The first domestic supply of ultra pure water produced with domestic technology to semiconductor manufacturing facilities
- Successful localization of 100% for design, construction, and operational technology for ultra pure water for semiconductors, and 70% for equipment

The Ministry of Environment (Minister Kim Wansup) announced that it will hold the 'Ultra Pure Water Domestic Production Demonstration Plant Supply Ceremony' on December 9 at SK Siltron Gumi Plant 2 (located in Gumi, Gyeongsangbuk-do), which is the first domestic supply of ultra pure water produced with domestic technology for semiconductor manufacturing processes.

Ultra Pure Water is water that is nearly free of impurities and is used to clean various by-products and contaminants from semiconductor surfaces. It is an essential resource used in modern advanced industries, including semiconductor, medical and bio, chemical, secondary batteries, and display industries.

To produce such ultra pure water, advanced water treatment technology is required to reduce the concentration of ionic substances to below 1 ppt (one trillionth) and the concentration of gases in water, such as dissolved oxygen,

to below 1 ppb (one billionth). Only a few countries around the world possess the necessary technology for production.

The ultra pure water market size is estimated to be KRW 2.2 trillion domestically and KRW 28 trillion internationally as of 2021, and it is projected to grow to KRW 2.5 trillion domestically and KRW 35.5 trillion internationally by 2028.

* Source: GWI Water data 2023

In response, the Ministry and the Korea Environmental Industry & Technology Institute have been promoting the ‘High Purity Industrial Water Domestic Production Technology Development Project’ since April 2021 to domesticate ultra pure water production technology in line with the increasingly advanced semiconductor industry. This initiative involves domestic water experts, including private water companies and academia, participating in the research, including K-water.

The Ministry has successfully supplied domestically produced ultra pure water for semiconductor processes by achieving 100% localization of design, construction, and operational technology and 70% localization of key equipment through the ultra pure water demonstration plant to be installed and operated at SK Siltron this December. This plant has the capacity to produce up to 1,200 tons of ultra pure water per day.

The design and construction technology is handled by Hansung Cleantech (ultra pure water plant) and Jinseong E&C (supply piping), while the core equipment is supplied by Samyang Corporation (ion exchange resin), Ecoset (ultraviolet oxidation device), and Sepra Tek (degassing membrane). The operational technology is managed by the Korea Water Resources Corporation.

Through this project, SK Siltron will continuously supply ultra pure water

produced with domestic technology 24 hours a day from December of this year until 2025 to produce silicon carbide (SiC) wafers. After the project's completion in 2025, the operation of the demonstration plant will be transferred to SK Siltron for ongoing use in wafer production.

This achievement has established a foundation for domestic companies to enter the ultra pure water market, which has been dominated by foreign companies such as those in the U.S. and Japan, significantly strengthening the competitiveness of not only the semiconductor industry but also advanced industries. SK Siltron, the largest semiconductor wafer production company in the country, is now able to supply SiC wafers made from ultra pure water produced with domestic technology to domestic semiconductor companies and export them abroad.

In addition, the Ministry is preparing a follow-up research and development (R&D) initiative to further enhance the ultra pure water technology secured thus far, to be pursued from 2026 to 2030. Starting from 2031, the Ministry plans to establish an ultra pure water platform center to accelerate the development of ultra pure water technology and the training of personnel.

Park Jae-hyun, Deputy Minister of Water Management Policy Office, stated, "The successful domestication of ultra pure water production technology will become a solid foundation for fostering the semiconductor industry." He added, "In the future, we will actively support the enhancement of domestic technological capabilities and the market entry of private companies to promote the stabilization of water supply for semiconductor industrial complexes and the activation of the ultra pure water ecosystem."