

The Energy Efficient Water Reuse by Combination of Nano-Filtration and Capacitive Deionization Processes

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Abstract : The high energy consuming processes such as advanced oxidation and reverse osmosis are used as a reuse process. This study aims at developing an energy efficient reuse process by combination of nanofiltration (NF) and capacitive deionization processes (CDI) processes. Lab scale experiments were conducted by using effluents from a wastewater treatment plant located at Koyang city in Korea. Commercial NF membrane (NE4040-70, Toray Ltd.) and CDI module (E40, Siontech INC.) were tested in series. The pollutant removal efficiencies were evaluated on the basis of Korean water quality criteria for water reuse. In addition, the energy consumptions were also calculated. As a result, the hybrid process showed lower energy consumption than conventional reverse osmosis process even though its effluent did meet the Korean standard. Consequently, this study suggests that the hybrid process is feasible for the energy efficient water reuse.

Keywords : capacitive deionization, energy efficient process, nanofiltration, water reuse

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