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A Study on the TDS Concentration Difference and Characteristics of Desorption Using MCDI Process and Circulation Process

Changseog Oh[1,2], Jusuk An[2], Seungjae Yeon[2], Hyun je Oh[1,2]
[1]Department of Environmental Research/Korea Institute of Civil Engineering and Building Technology
283 Goyangdae-ro, Ilsanseo-gu, Goyang-si, Gyeonggi-do, 10223, Republic of Korea
csoh@kict.re.kr; jusuk@kict.re.kr
[2]University of Science & Technology
217 Gajeong-ro Yuseong-gu, Daejeon, 34113, Republic of Korea
yeon@kict.re.kr; hjoh@kict.re.kr

Extended Abstract

Removing ions present in water is one of the important processes in water treatment, and this is called desalination [1]. Desalination technologies include evaporation, ion exchange, and reverse osmosis. However, this technology has problems such as high energy consumption during operation and periodic replacement due to membrane contamination. As a desalination technology that can solve these problems, research on capacitive deionization technology is being conducted, and recently, membrane capacitive deionization technology combining an ion exchange membrane and an electrode is being studied. Membrane capacitive desalination technology is easy to regenerate and maintain by selectively passing ions through adsorption and desorption. However, since adsorption and desorption require the same raw water, this process has a problem in that it must be continuously supplied [2]. Therefore, in this study, a process to increase the recovery rate was developed and the TDS concentration, characteristics of desorption using MCDI process and circulation process were evaluated. The MCDI module used in this study consists of one unit, and aqueous solutions of 100 mg/L and 300 mg/L were used as raw water. A voltage of 1.2 V was applied to each cell, and adsorption and desorption times were applied for 5 minutes each at a flow rate of 100 mL/min. As a result of the 40-cycle experiment, it was confirmed that stable production water was secured even when operated in a circulation process. In addition, it was confirmed through I.C. analysis that the concentration of each ion gradually increased, but when comparing the types and proportions of the analyzed ions, it was found that there was no significant difference.

References

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