

Surface modification of ion-exchange membranes for improving separation efficiency in electro-membrane processes

김도형, 강문성†

상명대학교

(solar@smu.ac.kr†)

Ion-exchange membranes (IEMs) can be used in various electro-membrane processes to desalinate or concentrate ionic substances. Separation performances of IEMs are highly dependent upon the surface characteristics, and therefore control of the membrane surface properties is very important. In particular, the monovalent ion selectivity and proton blocking property of IEMs can be determined by the membrane surface characteristics. Therefore, this study aims to optimize the monovalent ion selectivity and proton blocking property by physically and chemically modifying the IEM surface. Polypyrrole and graphene oxide were used as base materials for the surface modification, and the free volume, polarity, and hydrophilicity of the membrane surface were shown to be properly controlled through the surface modification. As a result of electro dialysis using the surface-modified IEMs, the separation performance was greatly improved after the surface modification. This work was supported in part by the MOTIE (No.10047796) and the MOE (No.2017000140002/RE201702218).