

Polyelectrolyte membranes with high fixed ion concentration for redox flow battery applications

송현비, 김도형¹, 강문성^{1,†}
상명대학교 천안캠퍼스; ¹상명대학교
(solar@smu.ac.kr[†])

In this work, novel pore-filled polyelectrolyte membranes (PFPEMs) have been successfully fabricated and characterized for the application to efficient redox flow battery. Especially, cost-effective and stable polyethylene-based porous substrate was chosen and the filling ionomer was designed to possess the high crosslinking degree and ion-exchange capacity (IEC) value, simultaneously. The prepared PFPEMs showed excellent electrochemical characteristics comparable or superior to those of the commercially available membranes. In particular, the electrical resistance values of the PFPEMs were largely lower than those of the commercial references owing to both the high IEC values and the reduced membrane thickness. The charge-discharge characteristics of the PFPEMs are shown to be dominated by the IEC and crosslinking degree. The maximum EE was determined as 83.9% at the optimum composition, which is superior to those of the reference membranes. This work was supported by a grant (No.2017000140002/ RE201702218) from the Environmental Industry Advancement Technology Development Project of Korea Environmental Industry & Technology funded by Korea Ministry of Environment.