

Optimization of High-pressure Water Electrolysis System Operating Conditions for Hydrogen Production

박미경, 김희용, 이광순*, 문상봉¹
서강대학교; ¹(주)엘캠텍
(kslee@sogang.ac.kr*)

There are many researches for hydrogen production because of expecting that hydrogen replace fossil fuel into the foreseeable future. We studied high-pressure PEM (proton exchange membrane) water electrolysis system for one of hydrogen production method, and proposed that optimal system operating conditions in terms of system efficiency. When the system operates, the manipulated variables are inlet water flow rates, current density (electric power), and pressure at cathode side, and the controlled variables are outlet temperature at both sides (or temperature in electrolyser), hydrogen purity, pressure and production rate, and volume ratio of hydrogen to oxygen at the anode side. We find the optimal operation condition that maintains the high hydrogen purity (eleven nine), pressure (over 300 bar) and production rate that we want, and safety from explosion because of volume ratio of hydrogen to oxygen at the anode side.