Influences of system configuration and operationg condition on molten carbonate fuel cell efficiency

곽하연, 양대륙*, 경지현, 이태원[1], 문길호[1], 이기풍[1], 류아림[1]
고려대학교; [1]두산중공업 기술연구원 연료전지개발센터
(dryang@korea.ac.kr*)

MCFC system which is operated about 650℃ is composed of the stack and the BOP. In this study, 1.2MW MCFC system at steady state is simulated by the Aspen Plus . The configuration of MCFC system and essential operating conditions are changed and then the efficiency of each case is analyzed. To analyze the efficiency of the system, both the Energy analysis and the Exergy analysis are performed. Exergy is the amount of energy "free of entropy" and is the maximum work output attainable in natural environment. From the exergy analysis, the real energy loss and efficiency loss by irreversibility which can't revealed by energy analysis is calculated. In this study, meaningful efficiency of MCFC is calculated through the exergy analysis and the method of optimization is considered. As the results of the analysis , according as the system configuration changes, efficiency is varied less than 0.5%. However according as the system operating conditions are changed, efiiciency is increased from 1.5% to 11%. Financial supported from the Ministry of Knowledge Economy (MKE) in 2008 and this research was supported by the Korea Institute of Energy Technology Evaluation and Planning(KETEP)(2008-N-FC12-J-04-2100).