

Steady-state optimization of a solid oxide fuel cell based auxiliary power unit system for heavy-duty truck

김대욱, 최수항¹, 이재형^{1,†}
한국과학기술원; ¹카이스트

Fuel-cell-based auxiliary power unit (APU) system for the heavy-duty truck is considered as a promising technology that can replace idling. By using this, we can not only reduce the exhaustion of the green-house gases but also increase the fuel efficiency. Among several possible combinations of the fuel cell and pre-fuel processor, solid oxide fuel cell (SOFC) and diesel-based auto-thermal reformer (ATR) have been proposed by several researchers for the APU application. In this study, we constructed overall APU system model including balance of plants (BOP) as well as SOFC and ATR. Especially, SOFC unit model was considered as distributed parameter model to observe temperature distribution in cell. And then, sensitivity analysis on several operating conditions was studied, and finally, steady-state optimization of overall system was carried out through the constructed model.