Studies on CFD simulation for Steam CO_2 reforming of Methane in fixed bed reactor

Muksh Upadhyay[1,2], 이진희[2,1], 권태운[2], 이윤주[2], 김태규[3],
안병성[2], 문동주[2,1,*]
[1]과학기술대학원대학교 청정연료 화학공학;
[2]한국과학기술연구원 청정에너지연구센터;
[3]조선대학교 항공우주공학과
(djmoon@kist.re.kr*)

The design of high performance catalyst, compact reactor and process plays an important role for the commercialization of GTL-FPSO process. In the present work, volume based reaction rate approach was employed to model steam carbon dioxide reforming (SCR) of methane in fixed bed reactor, and compared with experimental data. The reaction zone is assumed as a porous zone. A two dimensional axis symmetric computational fluid dynamics (CFD) model was developed for modeling. General kinetic models for SCR and water gas shift (WGS) reaction rates based on Langmuir Hinshelwood type were employed. Effects of operating conditions such as temperature and steam to methane ratio on the reformer performance were investigated. The results were successfully compared and validated with results from experimental data and showed fairly good agreements.