K/Ni-Co가 담지된 Zeolite Y 촉매를 이용한 에탄올 리포밍에 의한 수소 제조

곽병섭, 강미숙*
영남대학교
(mskang@ynu.ac.kr*)

The present work is focused on the investigation of hydrogen generation by ethanol steam reforming over Ni-Co loaded zeolite Y catalysts, which added by the potassium component to control the catalytic acidity. The TEM image of Ni component represents very uniform and clear distribution on Co3O4. The main products from steam reforming over Ni-Co loaded zeolite Y catalyst are H2, CO, CO2, CH4, and amount of C2~ hydrocarbons. However, the hydrocarbons were reduced by addition of potassium component, resulted to emitting the higher hydrogen production. The K/Ni-Co loaded zeolite Y catalyst provides significantly higher reforming reactivity; the H2 production is maximized to 50% at the conditions of reaction temp. 600oC and CH3CH2OH:H2O = 1: 3, with vaporizing at 10 mol% concentration, additionally with ethanol conversion above 90% in all ranges of reaction temperature without deactivation. We suggest a mechanism that potassium component plays an important role in decrease of Br nsted acid sites of Ni-Co loaded zeolite Y, and eventually, it makes increasing the hydrogen yield and suppressing hydrocarbon generation.