Effect of Ni loading amounts on ethanol steam reforming over successively impregnated $Ni/CeZrO_x-Al_2O_3$ catalysts

왕명연, 김상윤[1], Dao Duc Quang[1], 신은우[1,†]
울산대학교; [1]university of ulsan
(ewshin@ulsan.ac.kr[†])

In this study, successively impregnated $Ni/CeZrO_x-Al_2O_3$ catalysts with different Ni contents were prepared to strengthen hydrogen production efficiency and to enhance the stability due to the suppression of carbon deposits. The ESR reaction was tested at 550 °C and 750 °C. Additionally, the effect of catalytic active sites on the ESR reaction routes was investigated. From BET, yNi/CZ-Al catalysts remain a large surface area. H_2-TPR shows the effect of Ni loading on the interactions between Ni-CZ and $Ni-Al_2O_3$. NiO species are embedded deeply in the Al_2O_3 lattic to attenuate the dehydration that occurs on Al_2O_3. In addition, the interaction between Ni and CZ solid solution enhances the oxygen vacancy of the CZ solid solution. The Ni active sites accelerate the reforming of the activated steam so that the hydrocarbon can be converted to final SR products and at the same time reduce the generation of carbon deposits. On the other hand, at 750 °C, CO becomes one of the main factors to generate coke since RWG is significant at 750 °C. However, the successive impregnation of Ni and CZ into the support improves the WGS reaction, resulting in a high yield of H_2 even at 750 °C.