

Activation of Active Sites for Ethanol Steam Reforming over Ni/Ce_xZr_{1-x}O₂ Catalysts김상윤, 신은우[†], 왕명연, Nguyen Phu Huy¹, 정혜원울산대학교; ¹서울과학기술대학교(ewshin@ulsan.ac.kr[†])

Increase of worldwide demand on renewable energy and environmental concern are the major issues of today. Among the different feedstocks available, ethanol is a very promising candidate. Ni/ceria-zirconia (CZ) catalysts have been studied for this reaction due to the nature to make mobile oxygen species and high reducibility of CZ. Main active sites in SR are metal sites and oxygen vacancy sites from Ni and mixed-oxide support, respectively. They have different reaction mechanisms with different activation temperature. In addition, to further understand the role of the mixed oxide support in ESR, Ni/CZ catalysts were investigated with different Ce/Zr compositions of 0.067 and 15. Surface oxygen vacancy participate in water splitting or oxidation reactions and Sublayer oxygen vacancy can converse CO to CO₂ by water gas shift reaction. The characterizations such as structures and reduction temperature of prepared catalysts were analyzed by BET, Raman, XRD, TPR and XPS. Among the catalysts, Ce-rich catalyst exhibited high oxygen mobility according to high oxygen vacancies and it influence to highest production of hydrogen.