

Steam Reforming of Decahydronaphthalene over Ca modified Ni-based Hydrotalcite Catalyst김소정^{1,2}, 이승환¹, 이윤주^{1,3}, 이상득¹, 남석우⁴, 문동주^{1,2,*}¹KIST 청정에너지센터; ²UST 청정연료 화학공학;³고려대학교 화공생명공학과; ⁴KIST 연료전지센터

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Hydrogen is an ideal fuel because it is clean and simplifies the system integration. But infrastructures for hydrogen supply have not yet been established. For the mobile or stationary production of hydrogen, reforming of hydrocarbons is a practical method. Diesel has higher gravimetric and volumetric hydrogen density than LNG or LPG and well-established delivery infrastructure. In spite of these advantages, reforming of diesel has not been widely studied because of some problems such as severe coke formation, sulfur poisoning, etc.

In the study, steam reforming(SR) of decahydronaphthalene(Decalin; C₁₀H₁₈), which is a representative major component of diesel was investigated in a fixed-bed reactor system with the Steam/C ratio of 3, Gas Hourly Space Velocity(GHSV) of 10,000 h⁻¹ at the temperature range from 973 K to 1173 K by employing Ca modified Ni-based hydrotalcite catalysts (Ca_xNiMg/Al; x=0.01~1). Decalin was fully converted above 973 K with no condensable products. It was found that Ca_xNiMg/Al was maintained its catalytic activity during 58 h operation. Catalysts before and after SR were characterized by XRD, TEM, TPR and CO pulse chemisorption.