H_2-release properties of ammonia with Ru/La-Al_2O_3

김효영[1,2], 전미나[2], 김영천[2], 윤창원[2,†]
[1]고려대학교; [2]한국과학기술연구원
(cwyoon@kist.re.kr†)

To develop an ammonia based hydrogen production system, Ru based heterogeneous catalysts supported on La-doped alumina, Ru-$La_{(x)}$-Al_2O_3(x=0,1,5,10,20,30) were synthesized by conventional incipient wetness impregnation method. These catalysts were then characterized by a number of analytical technologies including X-ray diffraction (XRD), Brunauer-Emmett-Teller(BET), scanning electron microscopy(SEM), and scanning transmiss election microscopy(STEM), Temperature—programmed reduction(H_2-TPR), and X-ray photoelectron spectroscopy(XPS) indicating the formation of well dispersed Ru catalysts. The activity for NH_3 dehydrogenation over the as-synthesized catalysts were further assessed, and among them, Ru/$La_{(10)}$-Al_2O_3 showed super activity for the dehydrogenation of NH_3. In addition, the Ru/$La_{(10)}$-Al_2O_3 catalysts further presented high stability diving the desired reaction. The improved activity and durability were found to result for strong metal to support interactions, as partly evidenced by TPR and XPS.