Catalytic Decomposition of SO_3 using the Alumina and Titania Supported Catalysts in IS Cycle for the Thermochemical Hydrogen Production

김태호, 공경택[1], 이병권[1,*], 정광덕[1], 김홍곤[1], 이관영, 전희영[2], 신채호[2]
고려대학교 화공생명공학과;
[1]한국과학기술연구원 환경공정연구부;
[2]충북대학교 화학공학과
(bglee@kist.re.kr*)

Hydrogen is an attractive energy carrier, which could replace the fossil fuels. One of the promising methods for hydrogen production is thermochemical water splitting using VHTR (very high temperature gas-cooled reactor)

Recently, Iodine-Sulfur (IS) thermochemical process has been focused as a hydrogen production process with a great potential for industrialization. IS process is the continuous and closed cycle system consisting of three chemical step reactions; ⅰ) Bunsen reaction, ⅱ) HI decomposition, ⅲ) H_2SO_4 decomposition.

SO_3 decomposition is a step reaction to convert SO_3 into SO_2 and O_2 using the heat from VHTR in IS cycle. In this work, we prepared Al_2O_3 (Fe/Al_2O_3, Ni/Al_2O_3 and Co/Al_2O_3) and TiO_2 (Fe/TiO_2, Ni/TiO_2, and Co/TiO_2) supported catalysts by an incipient wetness impregnation and a sol-gel method to develop a high performance catalyst in this reaction. Catalytic reaction was performed in the temperature range of 750-900℃ in a fixed bed reactor.