Selective catalytic oxidation of hydrogen sulfide to elemental sulfur over vanadia loaded zirconia-pillared montmorillonite clay

비네쉬, 김상윤, 김동규, 박대원*
부산대학교
(dwpark@pusan.ac.kr*)

Over the last few decades, sulfur recovery from the H_2S containing acid gases (generated by oil refineries or natural gas plants) has become more and more important due to the ever increasing standards of efficiency required by environmental protection pressures. Pillared interlayered clays or pillared clays (PILCs) are two-dimensional zeolite-like materials prepared by exchanging the charge-compensating cations between the clay layer with large inorganic cations which are polymeric or oligomeric hydroxy cations formed by hydrolysis of metal oxides or salts. Upon heating, the metal hydroxy cations undergo dehydration and dehydroxylation, forming stable metal oxide clusters which act as pillars that maintain separation between the silicate layers and create interlayer space of molecular dimensions. In this study, a series of vanadia-loaded zirconia-pillared clays (V/Zr-PILCs) with various amounts of vanadia were prepared and characterized using X-ray diffraction (XRD), surface area-pore volume measurements, chemical analysis, X-ray photoelectron spectroscopy (XPS), ^{51}V spin-echo NMR and temperature-programmed desorption of ammonia (NH_3-TPD).