

Oxidative Dehydrogenation of Propane(ODHP) over vanadia supported metal oxide catalysts

윤지선, 서동진, 박태진, 서영웅*
한국과학기술연구원
(ywsuh@kist.re.kr*)

In recent years, a great deal of attention has been paid to the oxidative dehydrogenation of propane (ODHP) since thermodynamic limitations in non-oxidative propane dehydrogenation can be overcome through the use of an oxidant. Although numerous catalysts have been reported to be active for this reaction, vanadium oxide is one of key elements to show high propylene selectivity and yield at low temperatures because vanadium takes part in activating propane via α -H abstraction. Hence, we have conducted ODHP reaction with molecular oxygen as an oxidant at 600 °C over 5 wt% vanadia catalysts supported on various metal oxides. Among these catalysts, 5 wt% $\text{VO}_x/\text{Sb}_2\text{O}_3$ catalyst showed good propylene selectivity (ca. 35%) and yield (ca. 15%). To investigate the effect of physical properties of Sb_2O_3 into the catalytic ODHP performance, porous antimony oxides such as aerogel and xerogel were prepared and used as a support material. In addition, several dopants including F, P, and Mg were impregnated onto $\text{VO}_x/\text{Sb}_2\text{O}_3$ to enhance the reaction rate. The catalysts utilized in this study have been characterized by XRD, Raman spectroscopy, BET, TPR, TPO, etc.