

Comparison of partial oxidation of propane with butane over ceria-promoted Ni/calcium hydroxyapatite

곽정훈, 이상엽, 윤기준*
성균관대학교
(kijyoon@skku.edu*)

Propane and butane are the main components of LPG which has well-developed infrastructure for transportation. Nevertheless, studies on partial oxidation(POX) of LPG are very few. In this work, POX of propane and butane was studied in our laboratory by using ceria-promoted nickel-calcium hydroxyapatite ($Ce_xNi_{2.5}Ca_{10}(OH)_2(PO_4)_6$; $x = 0.1-0.3$) catalysts and then the experimental results from propane and butane feed were compared. The experiments were carried out with varying ceria content in the catalyst, O_2/C_3 or C_4 molar feed ratio(1.5-3.0) and temperature(823-1073 K). The optimum ceria content in the catalyst(x) was 0.1 for both propane and butane feed. The optimum O_2/C_3H_8 and O_2/C_4H_{10} ratios were 2.0 and 2.5-2.75, respectively. Under these conditions, CH_4 selectivity as higher while C_{2+} (C_2 , C_3 and/or C_4) selectivity was lower from propane when compared with those from butane. On the whole, the H_2 yield was higher from propane than butane. The long-term stability tests under the optimum conditions, exhibited that higher conversion, lower CH_4 and C_{2+} selectivity and thus higher H_2 yield were obtained on the whole from butane than propane.