

Catalytic decomposition of ethane over rubber-grade carbon blacks

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

Catalytic activities of several rubber-grade carbon blacks in ethane decomposition for CO₂-free hydrogen production were investigated. The ethane decomposition was carried out in a conventional fixed bed reactor under atmospheric pressure at 973–1173 K for 2 hours. When the decomposition in the presence of carbon black was compared with the non-catalytic thermal decomposition, the former exhibited significantly higher ethane conversion, higher C (s) selectivity and lower ethylene selectivity, which resulted in higher hydrogen yield. However, increase of the methane selectivity was small. This indicates that carbon black is catalytically effective for dehydrogenation of ethane as well as subsequent decomposition of ethylene. Among the carbon blacks investigated, fluffy N-330 showed the highest catalytic activity. The hydrogen yield obtained over N-330 was 80% at 1173 K, much higher than that (54%) obtained by the thermal decomposition. All the rubber-grade carbon blacks exhibited stable catalytic activity with time.