

A study of hydrogen production via SESMR on Ca-Ni-Al-based catal-sorbents: Influence of various precursors

임은지, 최성민, 하동수, 권용목, 조민선, 황병욱, 정석용,
김재창[†]
경북대학교
(kjchang@knu.ac.kr[†])

A study for pure H₂ production through the CO₂ capture in sorption enhanced steam methane reforming (SESMR) has been investigated. To obtain the pure H₂, various combination technologies of CaO sorbent had high CO₂ capture capacity and Ni-based reforming catalyst in high temperature necessary. In this study, The Ca-Ni-Al-based catal-sorbents was prepared via various co-precipitation methods. The 20 wt% Nickel (II) nitrate, 10 wt % aluminum nitrate and 70 wt % Calcium nitrate were dissolved in 150 mL of distilled water. This solution was stirred at room temperature for 6 h. The various samples were precipitated by adding NaOH (CNacp_NO), Na₂CO₃ (CNacp_NC), NaHCO₃ (CNacp_NHC), respectively, aged for 12 h, and then washed and separated by filtration. The Ca-Ni-Al-based catal-sorbents were carried out in a fixed-bed reactor at 600°C, S/C = 3. The CNacp_NHC catal-sorbent showed the higher CO₂ capture capacity and catalytic activity than the other catal-sorbents. These results were related to pore size, crystal structure and dispersion of Ni active sites of Ca-Ni-Al-based catal-sorbents.