Abstract

There is a need to search for efficient material that reduce CO_2 content and enhance the hydrogen composition in the product gas from biomass steam gasification particularly for large scale production. The present study was carried out to perform the characterization of commercial quicklime as CO_2 absorbent and Ni powder as catalyst. The chemical composition of the materials perform using x-ray fluorescence (XRF) indicated high amount of CaO and Ni in the bulk samples. Using XRF and SEM analyses, it was found that both materials showed high crystalinity. The adsorption isotherm from physisorption analysis suggested that the materials exhibits Type II category according to the IUPAC classification scheme. These types of material exhibit mesoporous structure which was also verified by the pore size of the samples found via BET analysis. The BET surface area reported was 4.16 m^2/g and 0.78 m^2/g for quicklime and Ni powder, respectively. In conclusion, commercial quicklime has the potential as CO_2 absorbent, based on the pore size and surface area. Conversely, the surface properties of the Ni powder were found relatively lower as compared to other commercial catalysts available for biomass steam gasification.