Pyrolysis of Biomass using Nickel Catalysts of Various Compositions for H_2 production

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Catalytic pyrolysis of biomass using Ni/Al_2O_3, Ni/CeO_2 and Ni/Al_2O_3-CeO_2 catalysts of various compositions prepared by coprecipitation method has been studied to produce H_2-rich product gases. In Ni/Al_2O_3-CeO_2 catalysts, Ni was maintained at the composition of 30wt%, whereas alumina and ceria are changed to 40wt%:60wt%, 50wt%:50wt% and 60wt%:40wt%. The papers used in daily writing purposes were adapted as biomass sample. The furnace temperature was increased to 800°C with heating rate of 10°C/min. and was maintained the temperature at 800°C for various residence time. 30wt%/(50wt%-50wt%) Ni/Al_2O_3-CeO_2 sample had shown the best performance in pyrolysis process. In each catalyst, residence time at final temperature has shown their performances to the best. The volume of H_2-gas has reached its highest value (5.22 ml) in the case of Ni/Al_2O_3-CeO_2 30wt%/(50wt%-50wt%) catalyst. It is concluded that Ni/CeO_2 catalysts are better in their performances than those of Ni/Al_2O_3 catalysts; whereas in Ni/Al_2O_3-CeO_2 catalysts, catalytic activity changes with change in the composition of alumina and ceria. Similarly, residence time at final temperature has also influenced in the product gas composition during the pyrolysis process.