

## ABSTRACT

Hydrogasification of some Indian coals has been carried out in a fixed bed semicontinuous reactor for the production of a fuel gas, rich in methane content under the pertinent process variables like temperature, hydrogen pressure, particle size, pretreatment temperature, catalysts, structural features etc. The effects of these variables on the yield of low molecular weight hydrocarbons in the range of  $C_1$  -  $C_2$ , and on the cumulative carbon conversion have been demonstrated by isothermal and non-isothermal experiments.

The experimental data have been correlated with some semi-empirical kinetic models and the rate coefficients have been determined for the hydrogasification of three coal types, viz. lignite briquette, lignite char and bituminous coal. Single particle kinetics have also been evaluated from some non-isothermal thermograv data. For lignite char a structural kinetic model has satisfactorily interpreted the experimental data.

This study has clearly demonstrated the suitability of the Indian coals for hydrogasification to obtain a pipeline gas. In the future scope of the work it has been emphasized that the fundamental study of hydrogasification of coal can also be carried out with effective catalysts, Using various gas-solid contacting devices like entrained bed reactor, fluidized bed reactor etc. from which more appropriate data may be collected for the scale up of a commercial reactor.

Keywords: Hydrogasification, Coal and Coal-char, Kinetics, Isothermal, Non-isothermal, Pore Structure.