

TECHNOLOGY DEVELOPMENT FOR THE PRODUCTION OF HYDROCARBONS FROM FAST PYROLYSIS OF KRAFT BLACK LIQUOR

Xuantian Li, NORAM Engineering and Constructors, Ltd., , Canada

xli@noram-eng.com

Jean Saayman, BC Research, Inc, Canada

Tony Boyd, Chris Chan, Ali Gulamhusein, Jim Wearing, NORAM Engineering and Constructors, Ltd., Canada

Clive Brereton , NORAM Engineering and Constructors, Ltd ; BC Research, Inc., Canada

Bart de Waele , Arend Jan Zeeuw , Huntsman Polyurethanes, Belgium

A proprietary thermochemical process is being developed for the production of high-value chemicals from black liquor through fast pyrolysis, catalytic upgrading and separation. One critical aspect of the reactor design is to ensure a preferable contacting mode between the liquid droplets and the solid particles so that fine droplets in the feed spray can coat the solid particles as a thin film in order to minimize mass transfer resistance for the pyrolysis reactions, while a fluidizable char with favorable particle size distribution and friability can be produced in the bed. A small portion of the char particles separated by the cyclones may be oxidized in a solids heater to supply the heat required for drying, heating and pyrolysis. The raw pyrolysis gas is upgraded in a catalytic reactor to improve the yields of the preferred products, while the catalyst is regenerated in a separate reactor by oxidizing the coke in a controlled gas environment. The fast pyrolysis process has been successfully demonstrated in a 4" dia. bench-scale fluidized bed pyrolyser, using a dual-fluid spray nozzle for feeding concentrated black liquor. Design considerations of a pilot system are also discussed.