

TRANSPORTATION FUELS FROM SYNTHESIS GAS. R. H. Fischer and R. E. Hildebrand. U.S. Department of Energy, Office of Fossil Energy Programs, Division of Fossil Fuel Processing, Mail Stop E-338/Germantown, Washington, DC 20545.

ABSTRACT

The Department of Energy (DOE) has formulated a program to develop improved processes to convert synthesis gas from coal to quality transportation fuels. The program involves four elements.

1. Improved integration of gasification with liquefaction. This involves the use of low ratio  $H_2$  to CO synthesis gas in the hydrocarbon formation step. Low ratio  $H_2$  to CO can be converted to hydrocarbon by means of the Kolbel-Engelhardt reaction. The net result is considerable energy savings in steam.
2. Improved selectivity by use of shape selective catalyst. Normal Fischer-Tropsch reaction chemistry is subject to inherent limitations due to the chain growth mechanisms. Use of shape selective catalysts can result in circumvention of this limitation by the use of an intermediate that can be formed in high selectivity (methanol) or by inhibition of the chain growth mechanism.
3. Use of improved thermally efficient liquefaction reactors. Use of the liquid or slurry phase reactor can possibly result in single pass conversion, elimination of recycle, improved temperature control, and recovery of the heat of reaction at higher efficiency.
4. Production of methanol and fuel grade alcohol from low ratio  $H_2$ -CO syn gas using liquid or slurry phase reactors.

The key to success in this effort will be a close integration of the gasification and synthesis steps so that the amount of steam and oxygen consumed by the total process will be minimized and the thermal efficiency maximized.

The initial contracts in this program are about to be signed and others are beginning negotiation. The goals of the program and this up coming work will be discussed.