

PREMIUM TRANSPORTATION FUELS FROM SYNGAS. G. Alex Mills, Department of Energy, A-118, Germantown, Washington, D.C. 20545

There is an essential need for synthetic liquid transportation fuels. Indirect liquefaction involving coal derived syngas has gained new interest because of new discoveries in the catalytic synthesis of liquids from $\text{CO}+\text{H}_2$. Catalytic improvements have been made in the manufacture of CH_3OH and higher alcohols. Also, higher engine efficiency is made possible by a combination of high compression ratio and catalytic decomposition of alcohol to provide a gaseous fuel to the engine using heat otherwise wasted.

Conversion of CH_3OH over ZSM-5 zeolite catalyst to high octane gasoline is remarkable. Also, beginning with $\text{CO}+\text{H}_2$ mixtures, of special interest is the application of catalyts having dual functions (metal + acid) in combination with shape selective zeolites for control of both chemical composition and product molecular size. Further, the addition of a shift function to the hydrocarbon synthesis function makes possible the water gas shift in-situ in the reactor, thus permitting the use of syngas of low H_2/CO ratios, although with problems in simultaneous optimization of aromatization and shift reactions.