

A NEW OUTLOOK ON COAL LIQUEFACTION THROUGH SHORT CONTACT TIME THERMAL REACTIONS -- CHEMICAL FACTORS WHICH LEAD TO HIGH REACTIVITY, D. D. Whitehurst, Mobil Research and Development Corporation, P. O. Box 1025, Princeton, New Jersey 08540

In the presence of certain solvents and at elevated temperatures ( $\sim 400^{\circ}\text{C}$ ), coals can be transformed to soluble products in high yields in less than 5 minutes. This observation has led to a number of potentially new coal liquefaction processes.

The ease of coal transformation is dependent on the chemical and physical nature of the coal and the chemical nature of the solvent. Contrary to past reports, the rate of coal solubilization was observed to be dependent on the hydroaromatic content of the solvent. With a solvent having limited hydroaromatic content, maximum conversions were observed for coals having  $\sim 85\%$  carbon (maf). High conversion was associated with low hydrogen consumption.

High reactivity was found to be associated with coals which swell with solvents or become plastic easily. The significant chemical properties of highly reactive coals were observed to be an intermediate aromatic carbon content, and the presence of  $\text{Ar-CH}_2-$  or  $\text{ArCH}_2\text{-CH}_2\text{-Ar}$  groups.