

Wiley

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UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
OFFICE OF SYNTHETIC LIQUID FUEL
LOUISIANA, MISSOURI

From Dr. Pier's File

T - 431

High Pressure Experiments
Ludwigshafen, 558

W. M. Sternberg
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PRINCIPAL DATA ON THE FOAMING PROCESS FOR THE HYDRO-CARBON SYNTHESIS

By Michael

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Process:

The gas is forced into a sump filled with paraffin produced in the reaction and containing colloidal iron (a filter plate is used with a pore width of 0.15 mm.)

Heat removal:

The sump is cooled by making the contents circulate through a relatively small outside cooler (heat transfer from liquid to liquid). Permissible heat rise 10°C. One sump circuit in about 3 minutes.

Reactor Construction:

An empty vertical cylinder 8 mm high which contains in the bottom part a number of foaming plates (of granular quartz, held together by glass). A small vessel, in which the sump is degased, adjoins the reactor.

Catalysts:

Iron from iron carbonyl (or else obtained by precipitation) ground in oil to a particle size of 2 μ . 2 percent alkali (borax) added. 300 - 350 kg Fe/cbm. of sump.

Synthesis gas:

CO : H₂ = 5 : 4

Pressure:	20 atm.												
Temperature:	250°C												
Production:	0.30 - 0.35; if the gas is recirculated, with a CO ₂ scrubber 0.40 - 0.45.												
Products:	<table border="0"> <tr> <td>Gasol</td> <td>8 - 10 percent</td> </tr> <tr> <td>Gasoline, - 200°C</td> <td>45 "</td> </tr> <tr> <td>Middle oil, 200 - 350°C</td> <td>30 "</td> </tr> <tr> <td>Paraffin, 350°C</td> <td>15 "</td> </tr> <tr> <td>Gasification,</td> <td>abt. 5 "</td> </tr> </table>	Gasol	8 - 10 percent	Gasoline, - 200°C	45 "	Middle oil, 200 - 350°C	30 "	Paraffin, 350°C	15 "	Gasification,	abt. 5 "		
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Yields:	175 g liquid and solid products per cbm utilized gas, 160 g liquid and solid products per nebm gas (90% convers.).												
Applications:	65 percent of the gasoline can be converted to alcohols by the oxo process (lacquer section). 40 - 50 percent of the middle oil gives sulfonates with H ₂ SO ₄ (detergents).												
Experiments to date:	1.5 cbm reactors with seven months operation. Longest continuous operations - three months. No more difficulties are being experienced.												
Industrial units:	Reactors 8 m high, 2 m diam., 30 cbm capacity, or else reactors 8 m high, 2.5 m diameter, cap. 45 cbm.												
New experimental reactor:	8 m high, diam. 1.50 m, cap. 13.5 cbm, for 5 te/day.												

/S/ Michael