

Table 2 : Constant experimental conditions

Property	Value
Space velocity	100 sccm/gcat
Syngas ratio (H <sub>2</sub> /CO)	2/1
Catalyst type	Ruhrchemie iron catalyst
Catalyst loading	1 g
Hexane flowrate	1.0 ml/min

Table 3: Surface Area and Pore Volumes of Ruhrchemie Iron Catalyst

	Fresh catalyst	Pretreated (only) catalyst	Press. (bar)				
			20	31	39	50	60
Surface area (m <sup>2</sup> /g)	306.36	104.3	15.3	93.2	91.3	36.4	87.9
Pore volume (cm <sup>3</sup> /g)	0.464	0.282	0.069	0.273	0.302	0.154	0.318

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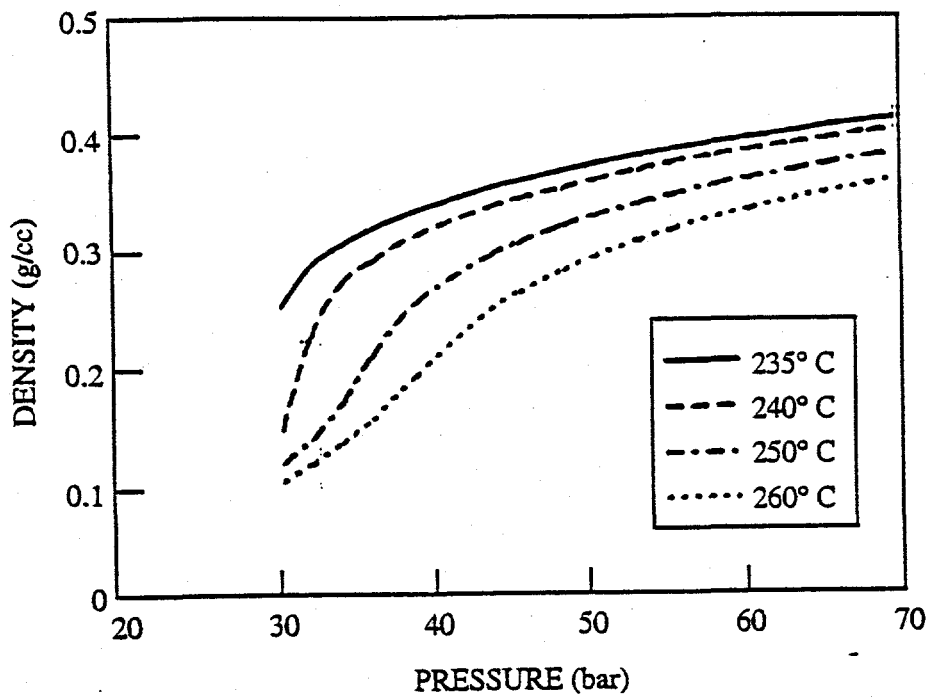


Figure 1. Variation of *n*-hexane density with pressure at typical FT synthesis temperatures

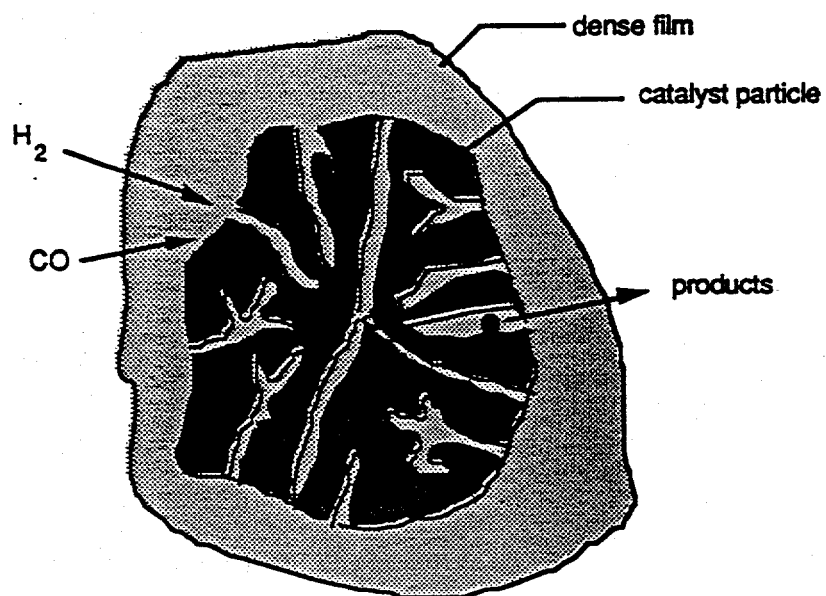


Figure 2. Physicochemical processes during multiphase FT synthesis

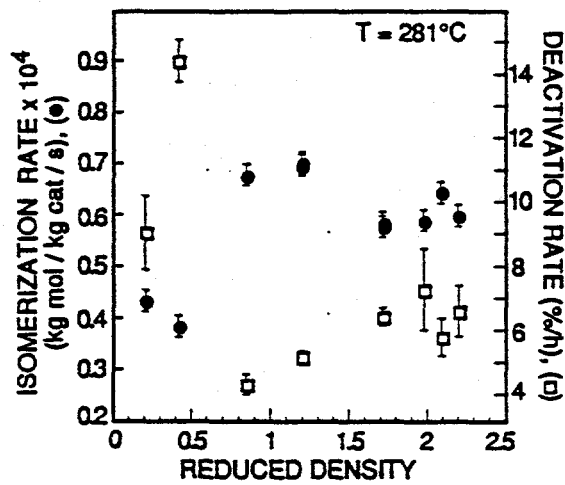


Figure 3. End-of-run isomerization and deactivation rates in sub- and supercritical reaction media (Ginosar and Subramaniam, 1994).

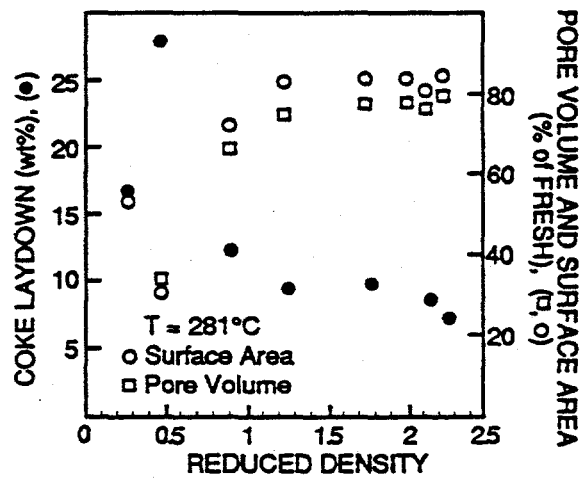


Figure 4. End-of-run coke laydown, pore volume and surface area in catalysts exposed to sub- and supercritical reaction media (Ginosar and Subramaniam, 1994).

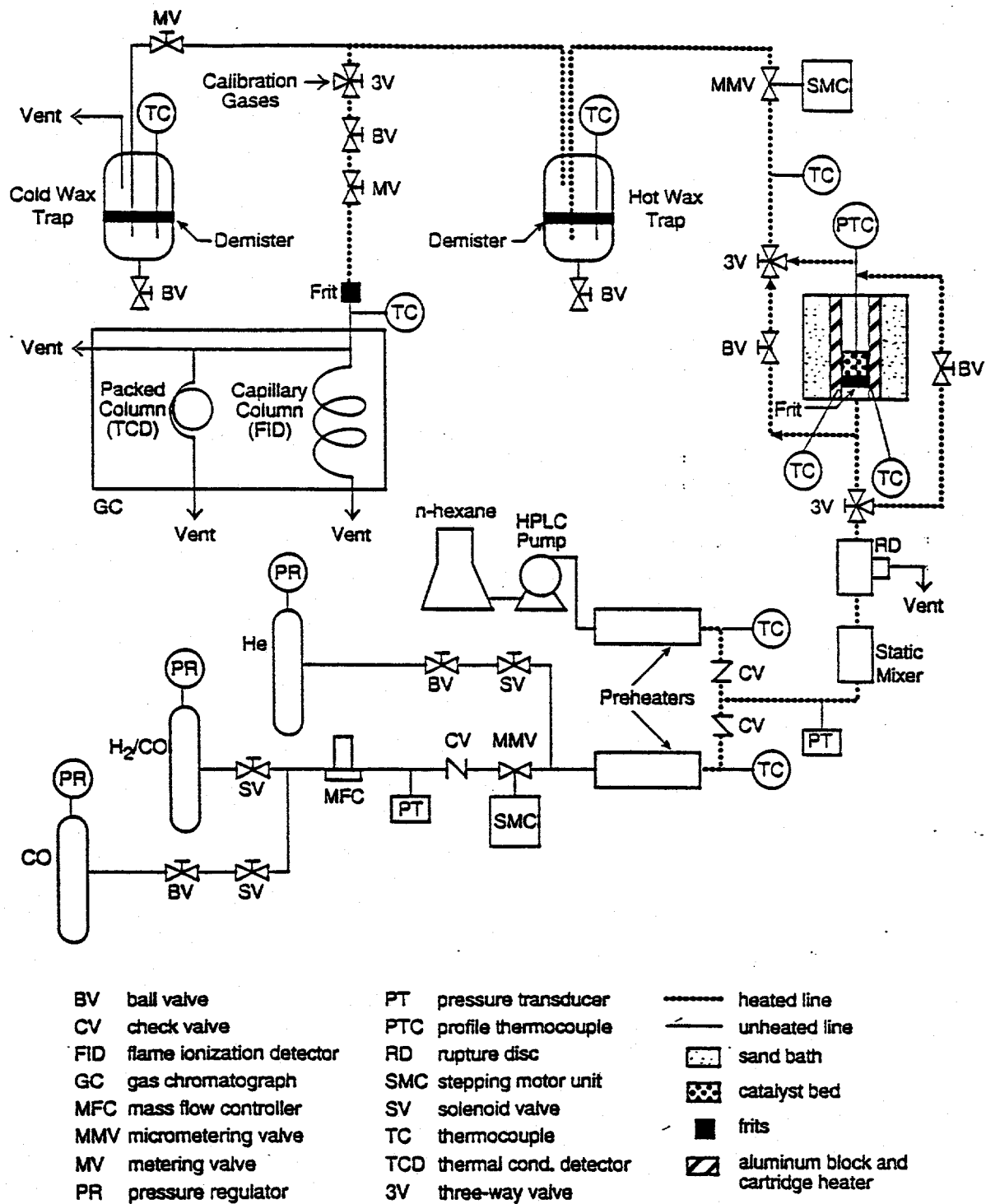


Figure 5. Schematic of existing FT synthesis reactor unit

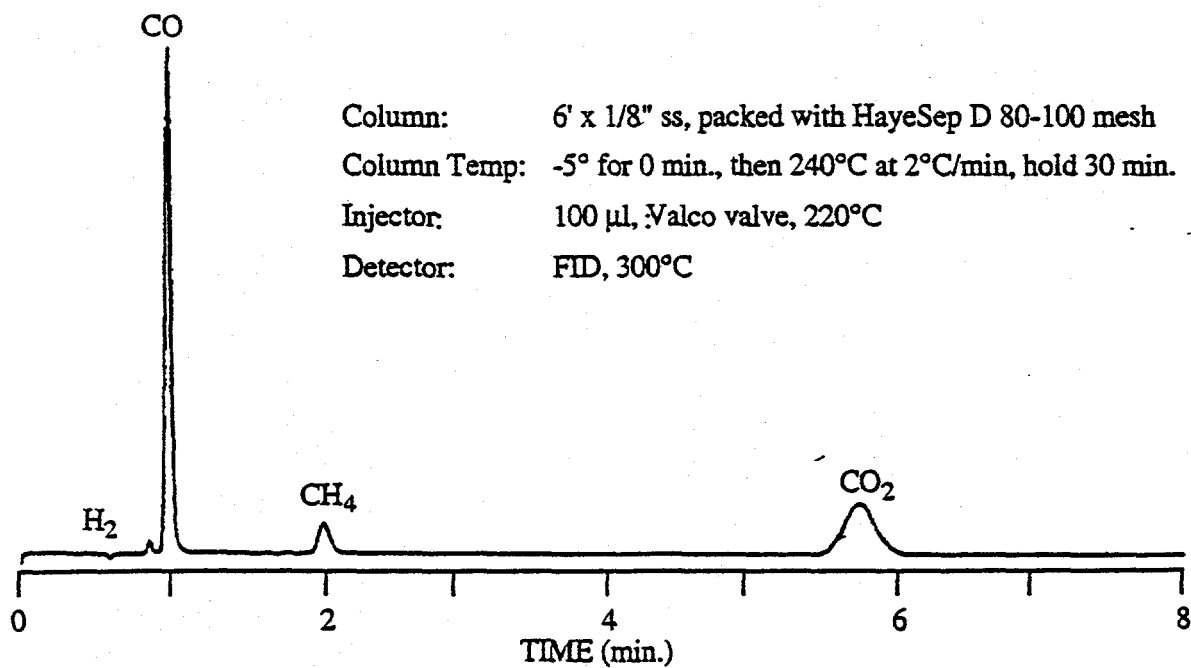
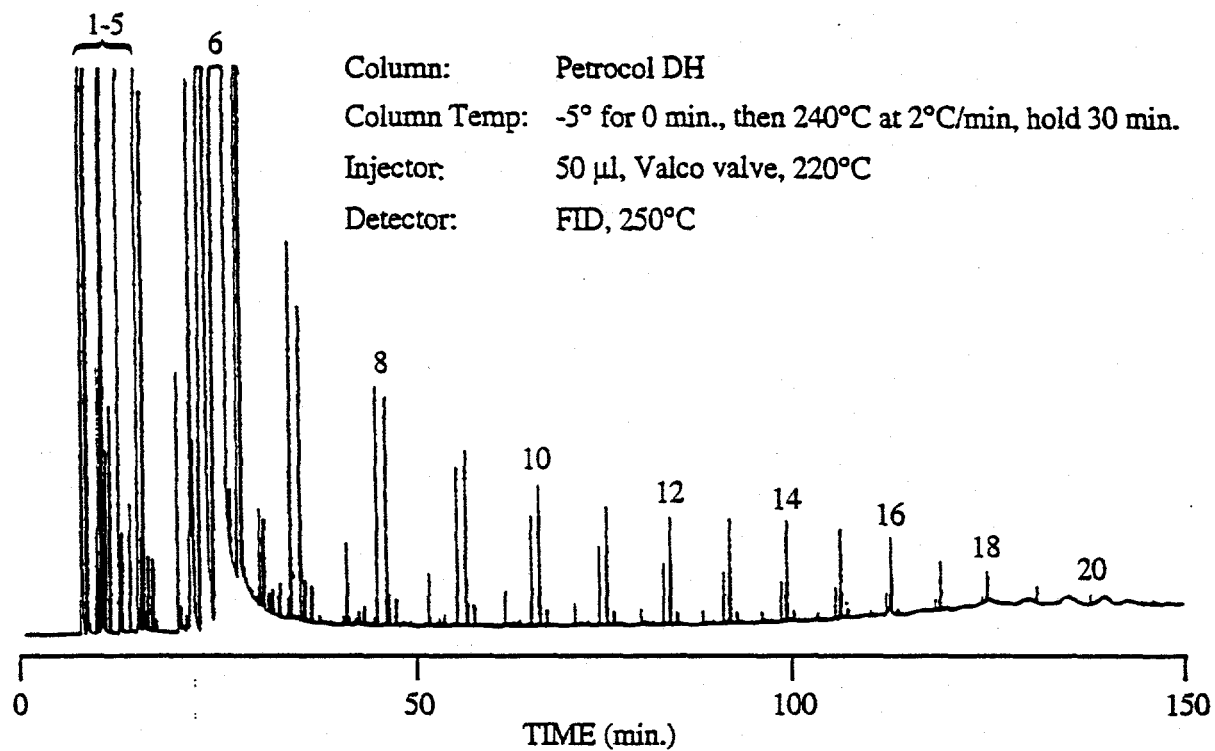
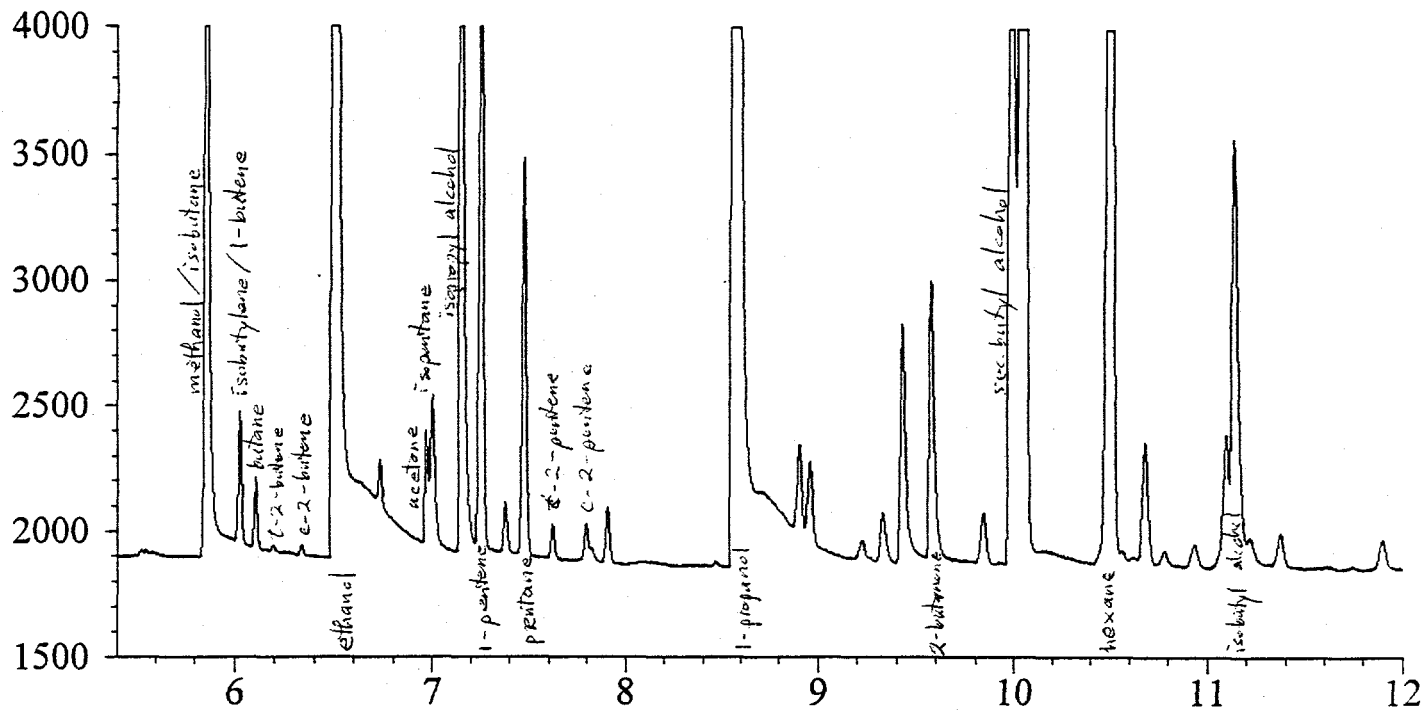


Figure 6. On-line analysis of permanent gases,  $\text{C}_1\text{-C}_{20}$  hydrocarbons and oxygenates

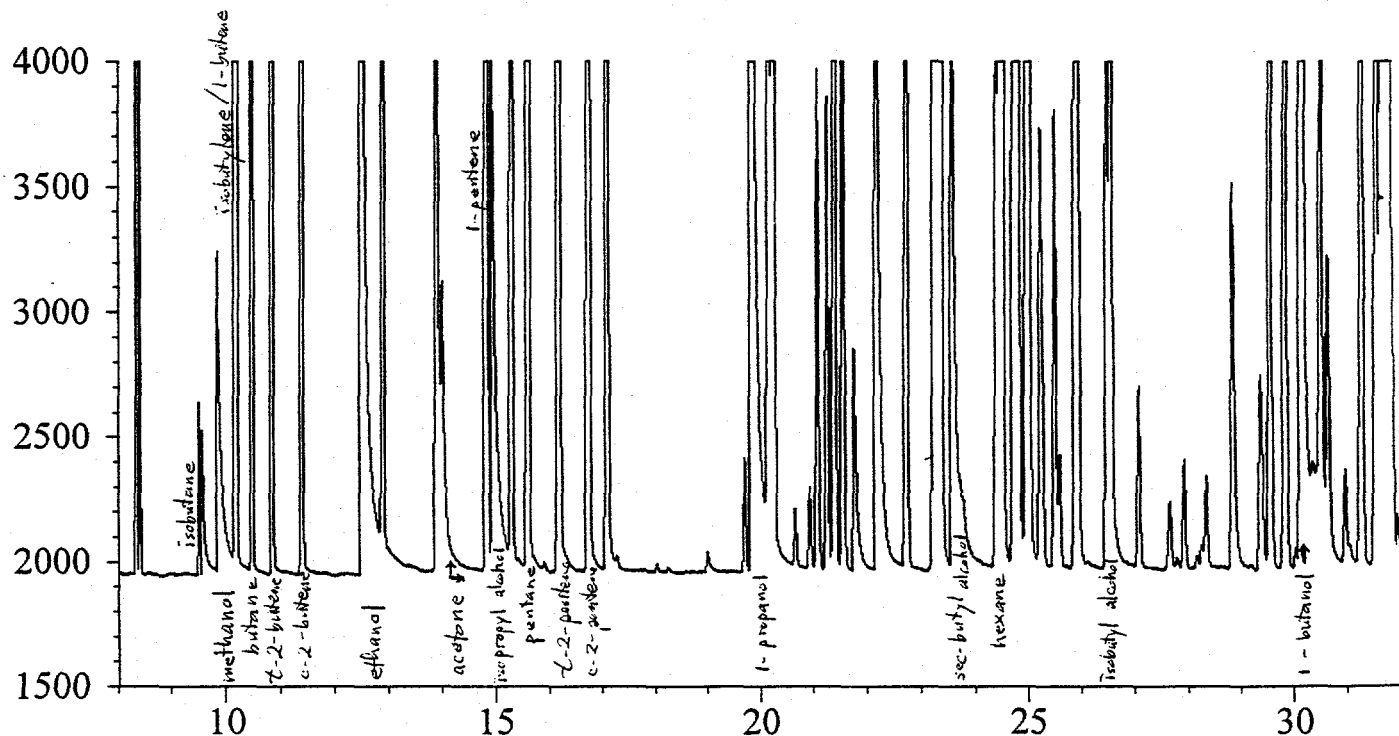


Fig. 1 in C:\HPCHEM\1\DATA\TM2DPM.D



Texas A & M, FT organic phase Time (min.)  
 30°C up at 2°C/min, 70 psig column head pressure

Fig. 1 in C:\HPCHEM\1\DATA\UK43-52.D

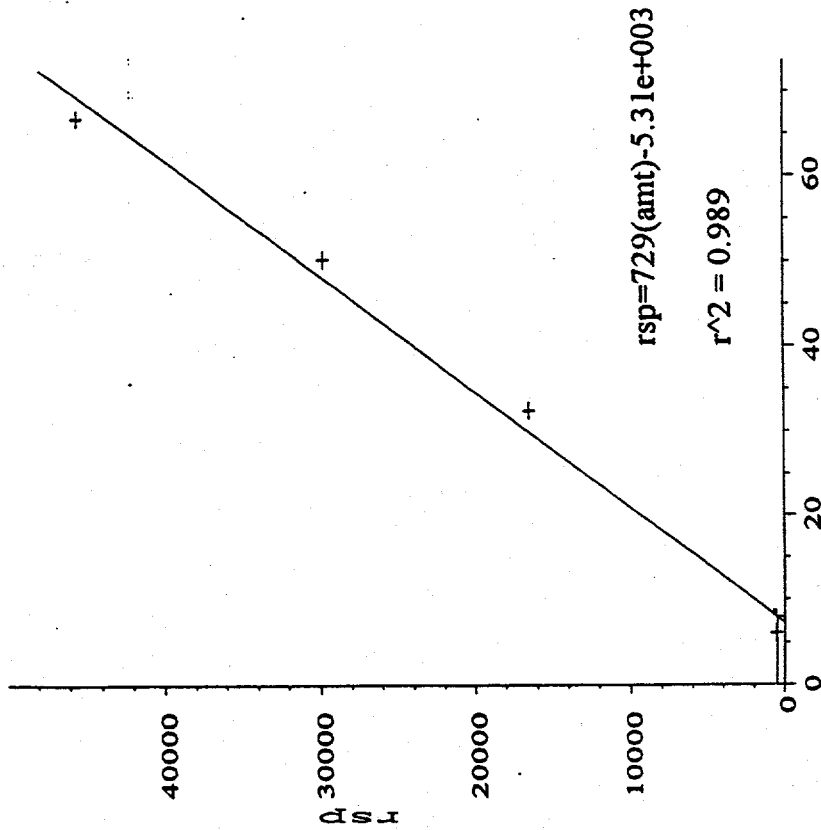


University of Kentucky, FT organic Time (min.)  
 -5°C up at 2°C/min, 43 psig column head pressure

Figure 7

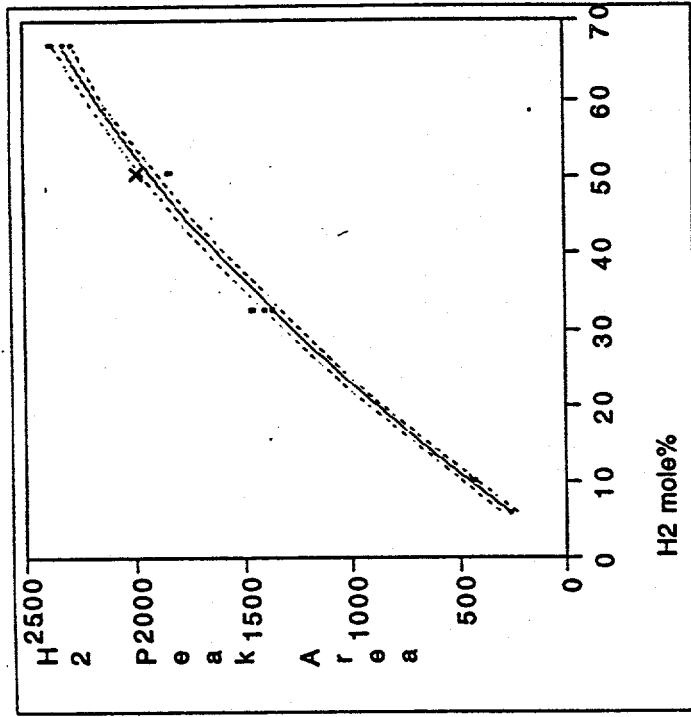
Figure 9. External Standard Calibration Curve for Hydrogen, 5 replicates using Helium carrier gas

H<sub>2</sub>/He/300C/1ml



amt

Sample Size: 1 ml  
Detector Temp: 300 °C



Fitting

--- Polynomial Fit, degree=2

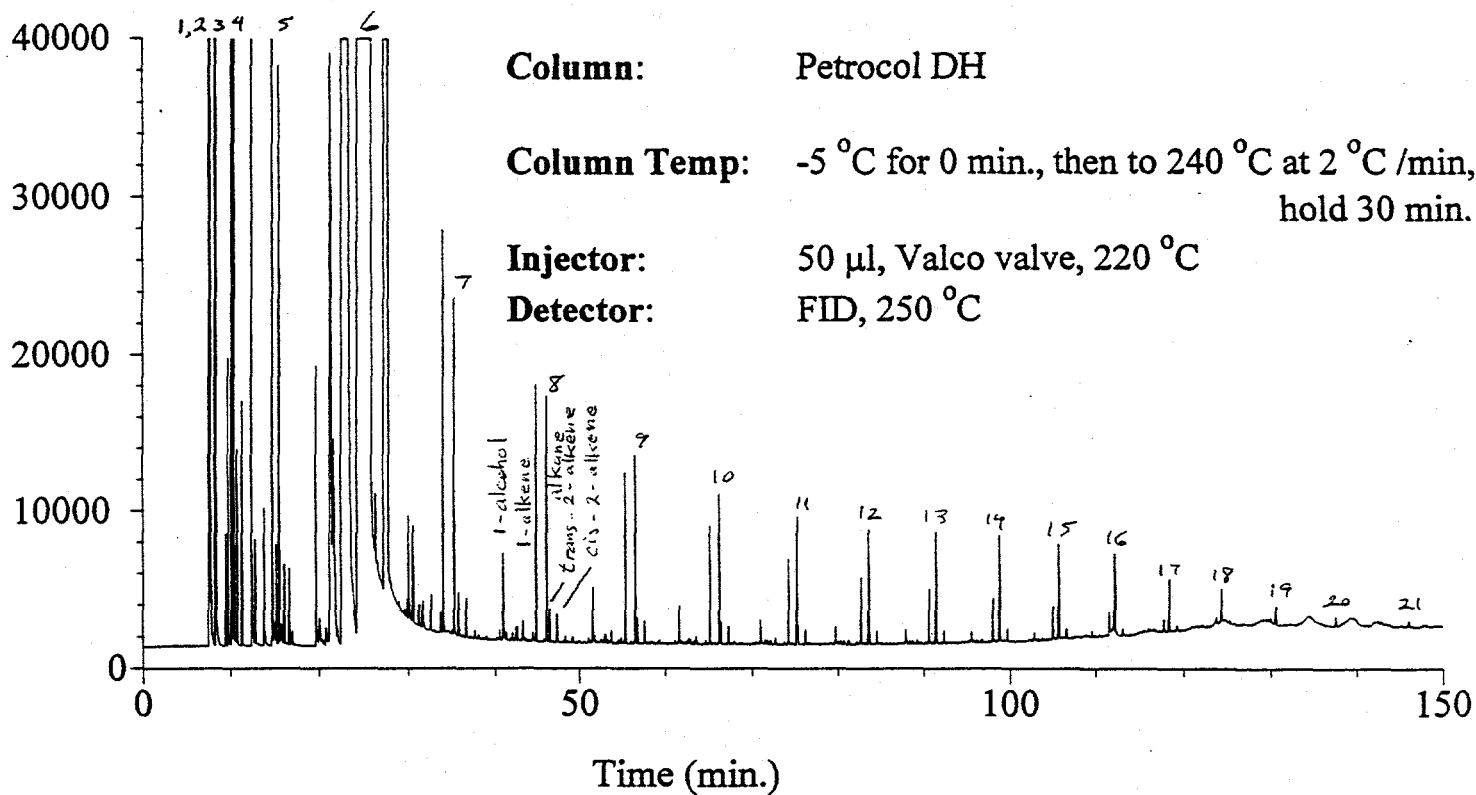
Polynomial Fit, degree=2

Summary of Fit

Rsquare 0.996049  
Root Mean Square Error 54.2705  
Mean of Response 1240.625  
Observations (or Sum Wgts)

Sample Size: 10 ml  
Detector Temp: 130 °C

# C1 to C20 Hydrocarbons and Oxygenates



# Permanent Gases

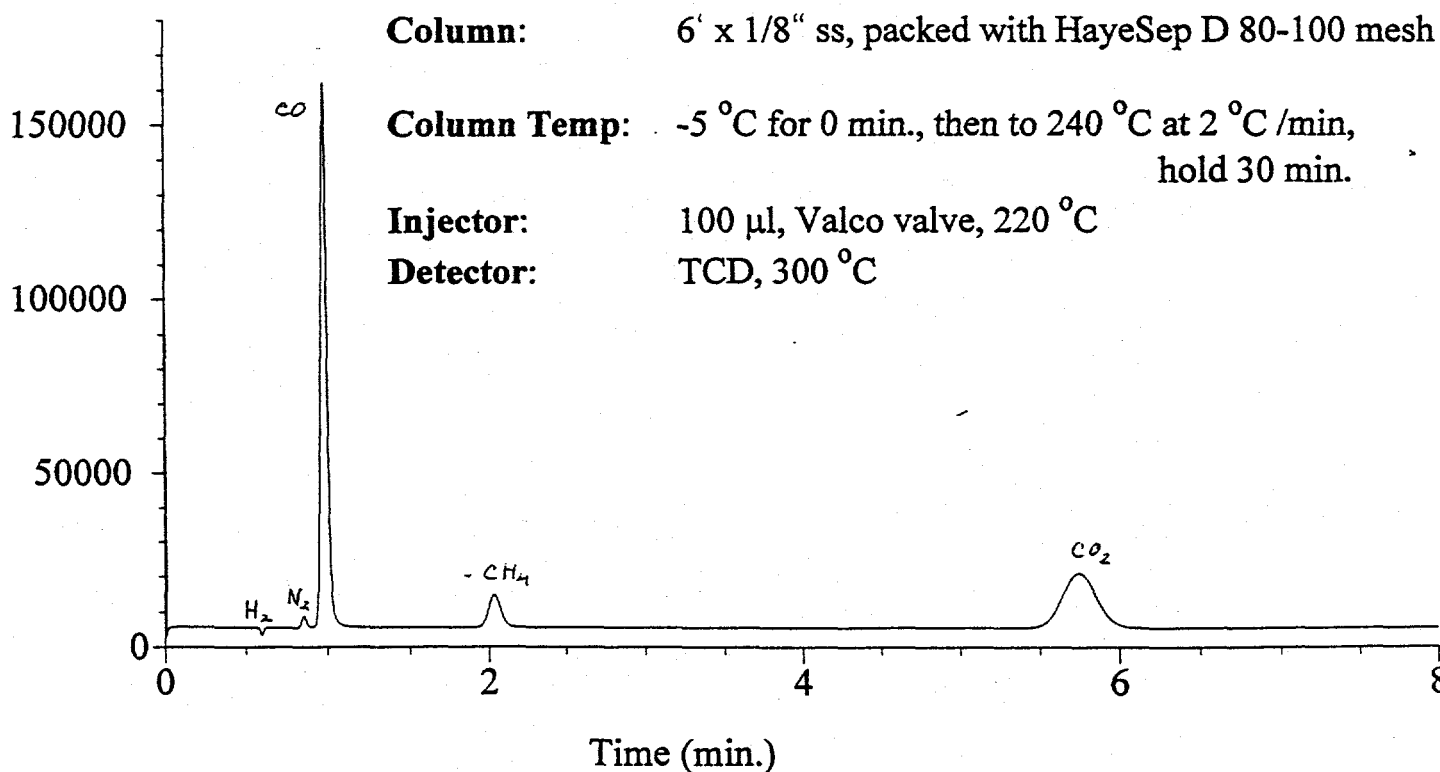
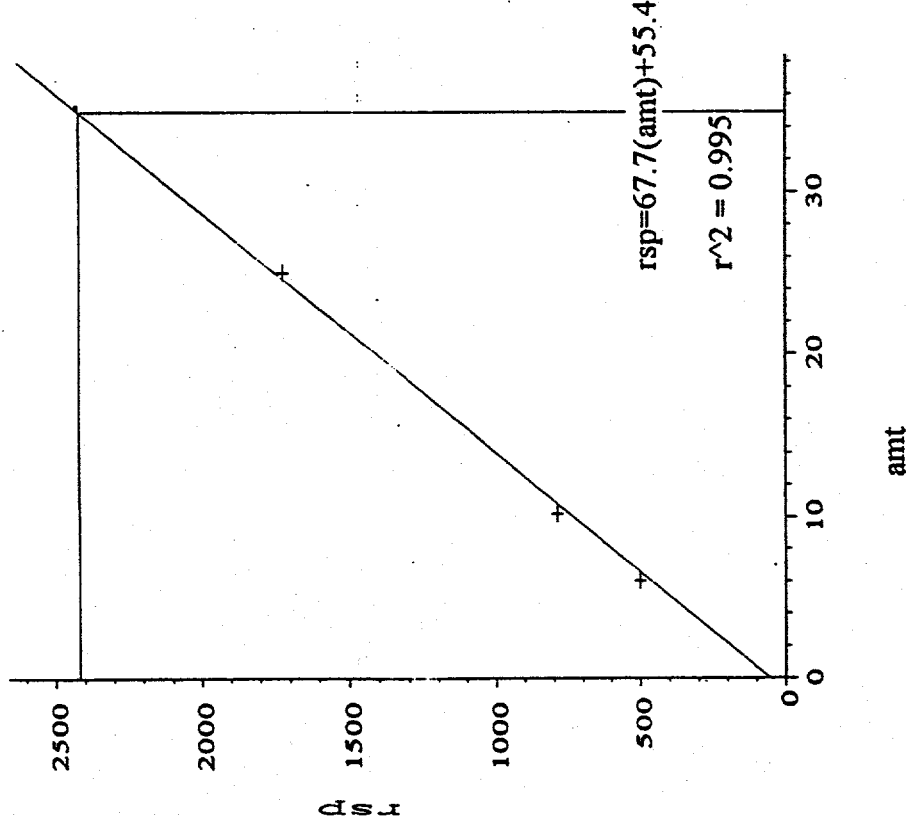


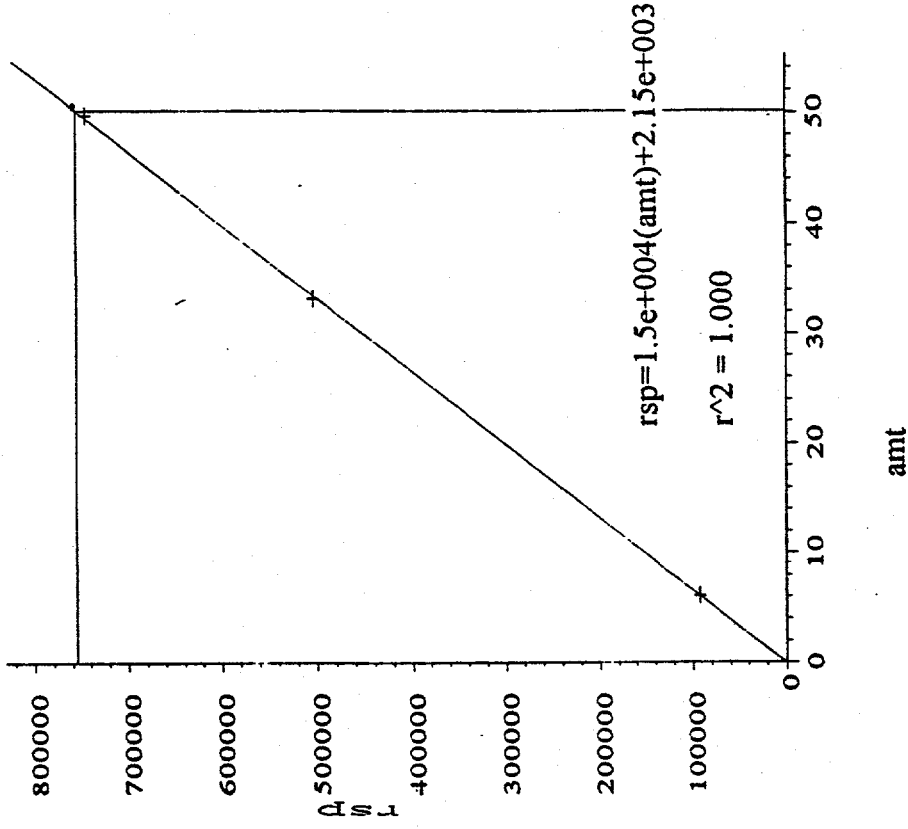
Figure 8

Figure 10 External Standard Calibration Curves for H<sub>2</sub> and CO, 5 replicates using Helium carrier gas

H<sub>2</sub>/He/130C/30ul

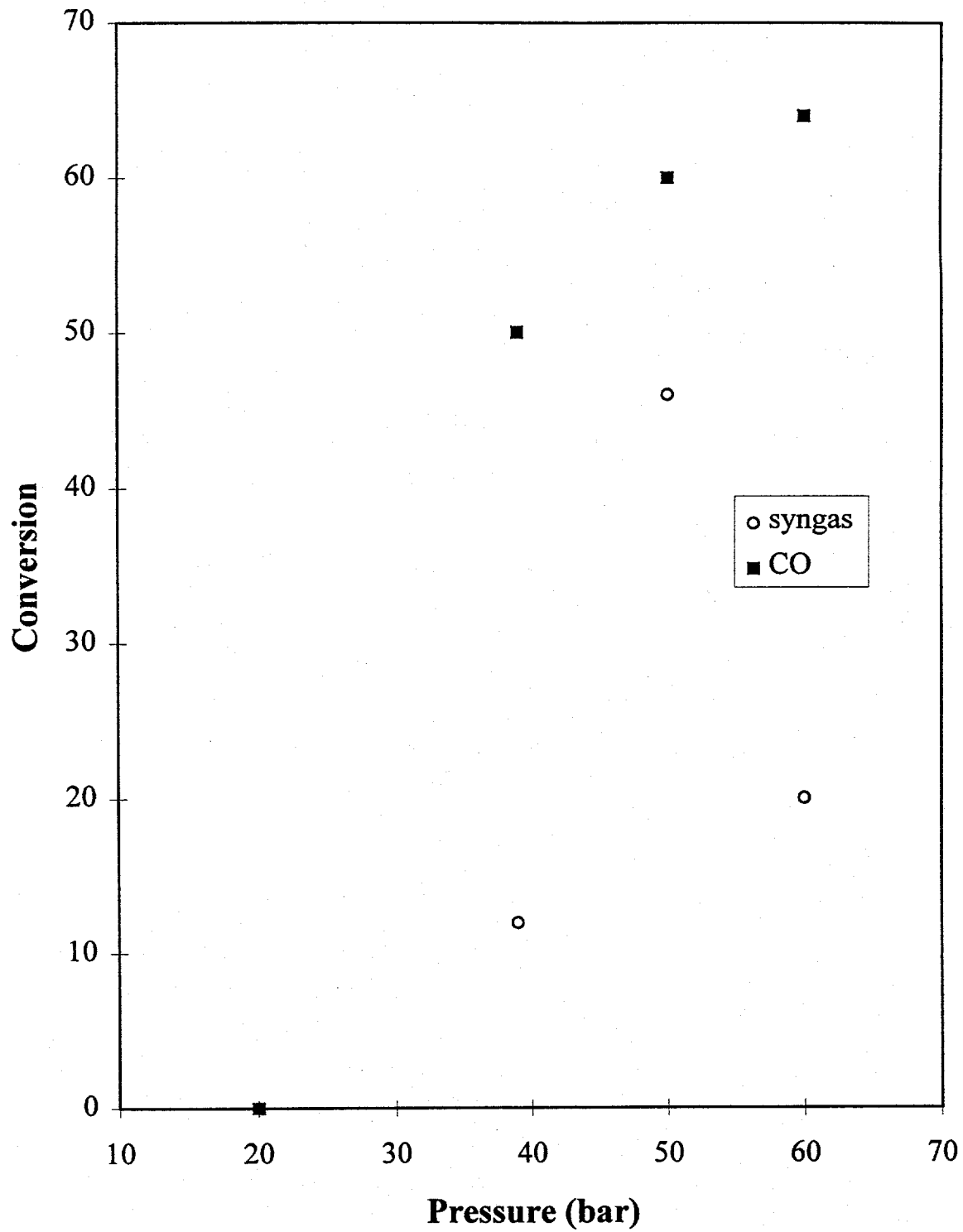


CO/He/130C/30ul

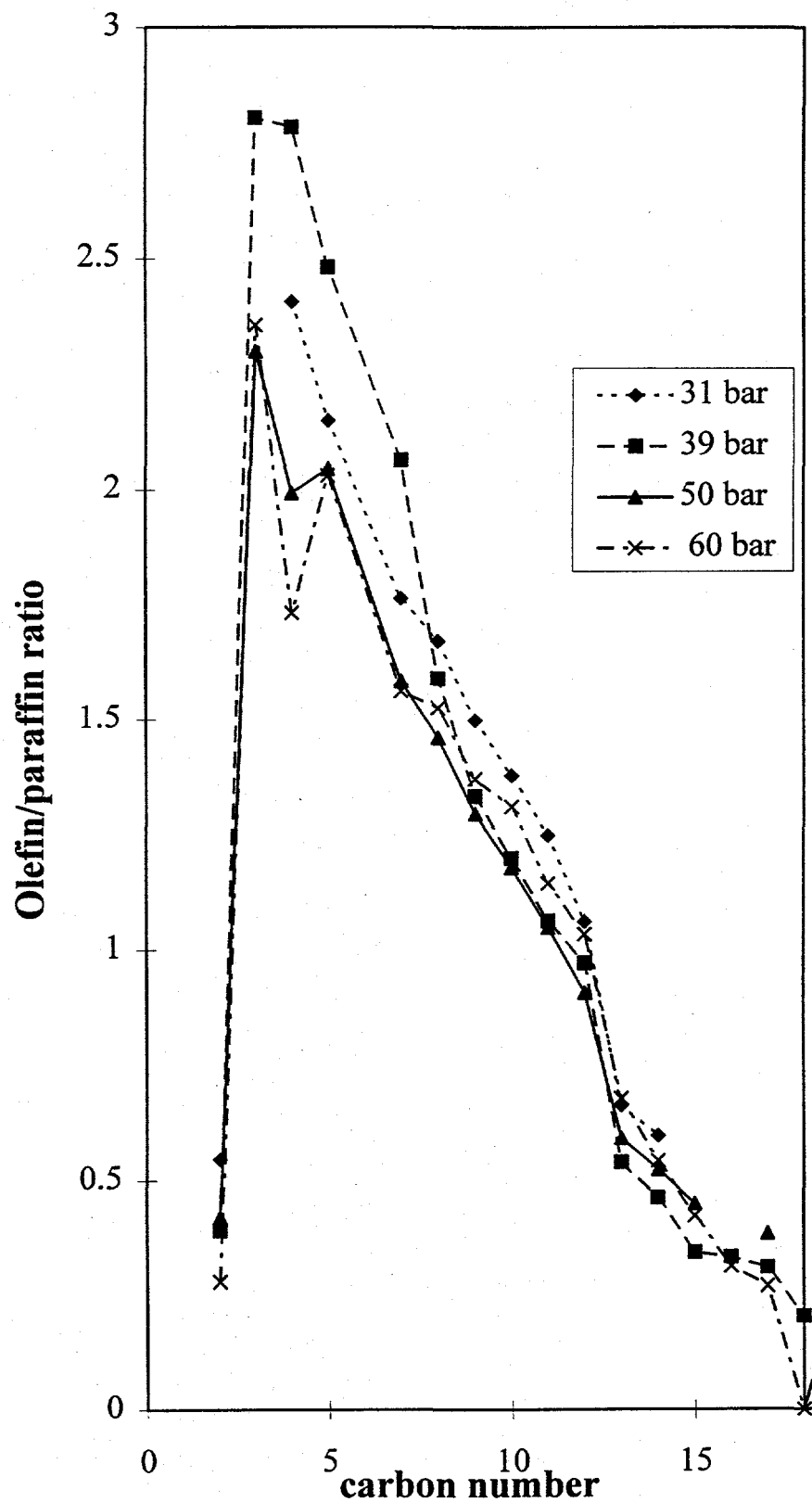


Sample Size: 30 ul  
 Detector Temp: 130°C

**Fig. 11 : Variation of CO and syngas conversions with pressure**



**Fig. 12: Variation of Olefin/Paraffin selectivity at the various pressures**



**Fig.13: Variation of the Alcohol/Paraffin selectivity at the various pressures**

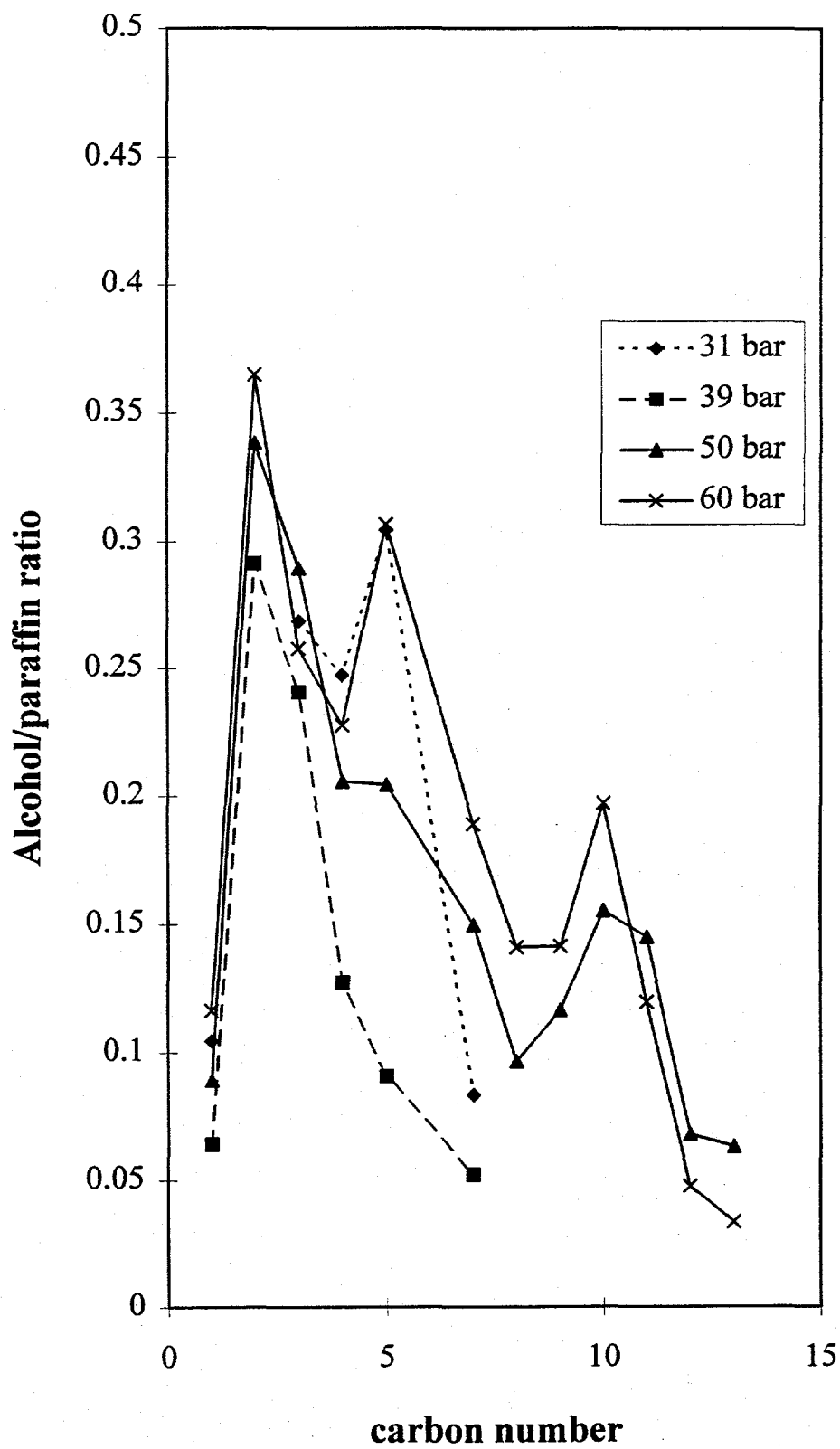
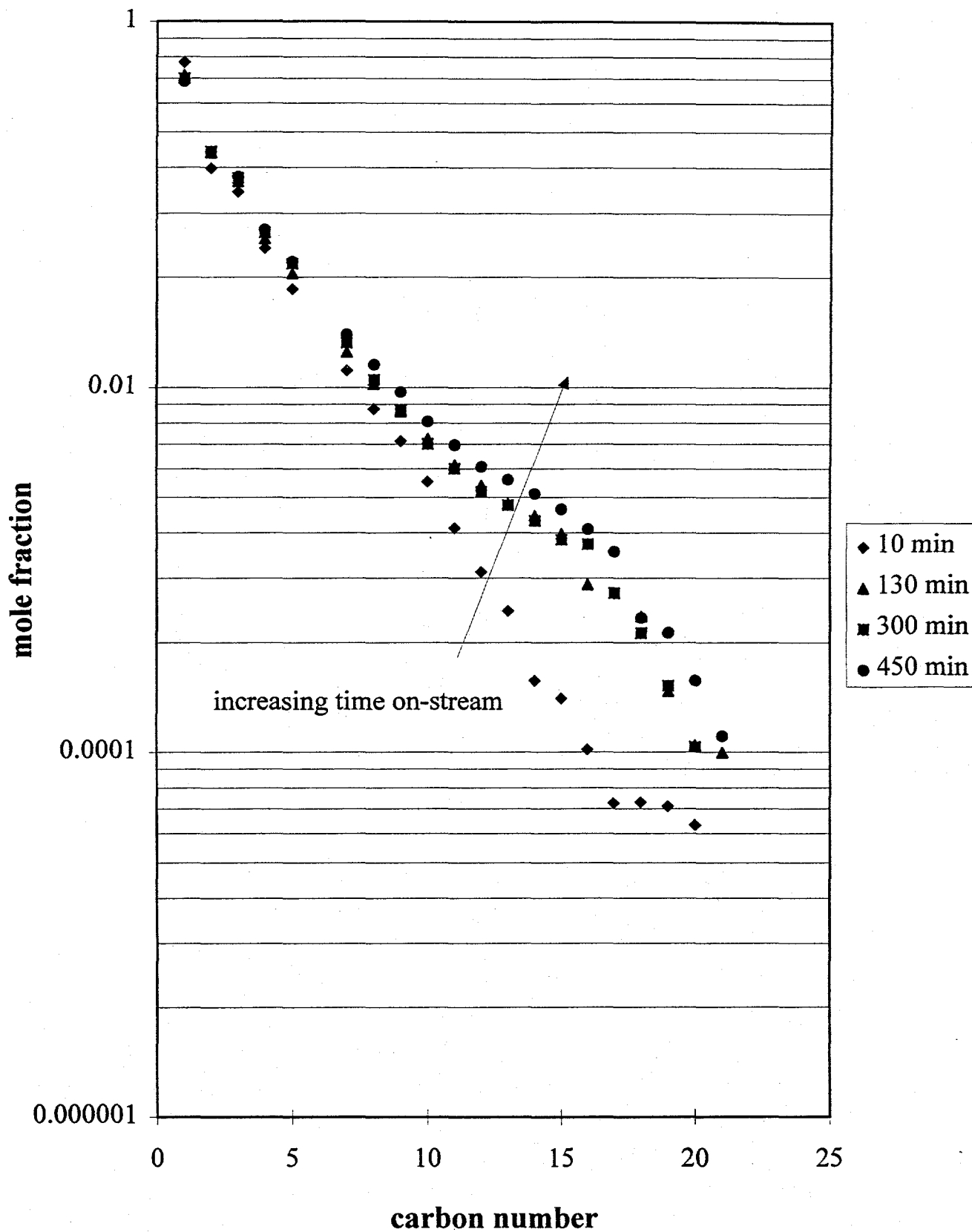


Fig. 14: ASF distribution for a single run (50 bar)





**Fig. 15: End-of-run  $\alpha$  values for the various runs**

