

APPENDIX H

SAMPLE PRODUCT ANALYSIS AND MATERIAL BALANCE

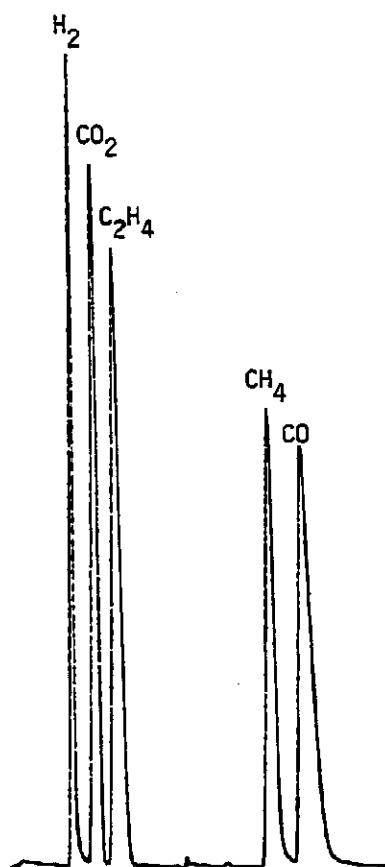


Figure H.1. Chromatogram of Sample Feed Gas
(Run # 08063).

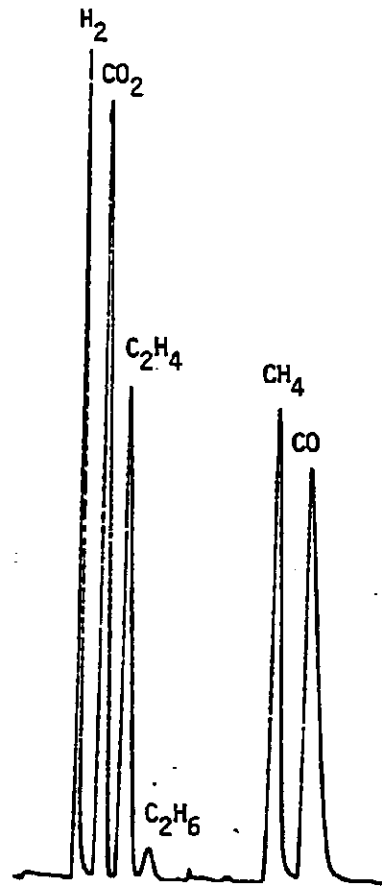


Figure H.2. Chromatogram of Sample Gaseous Product
(Sample # 080631029).

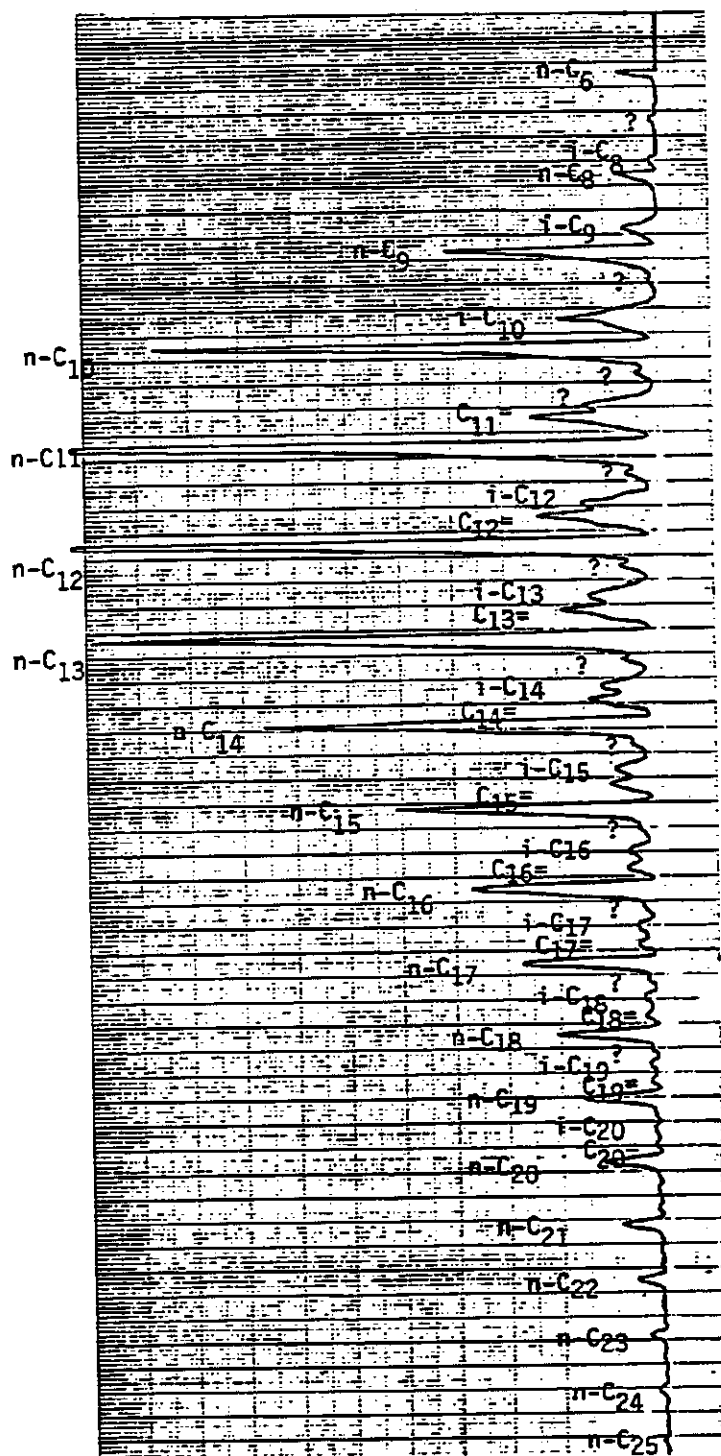


Figure H.3. Chromatogram of Sample Liquid Organic Product
(Sample # 080632100).

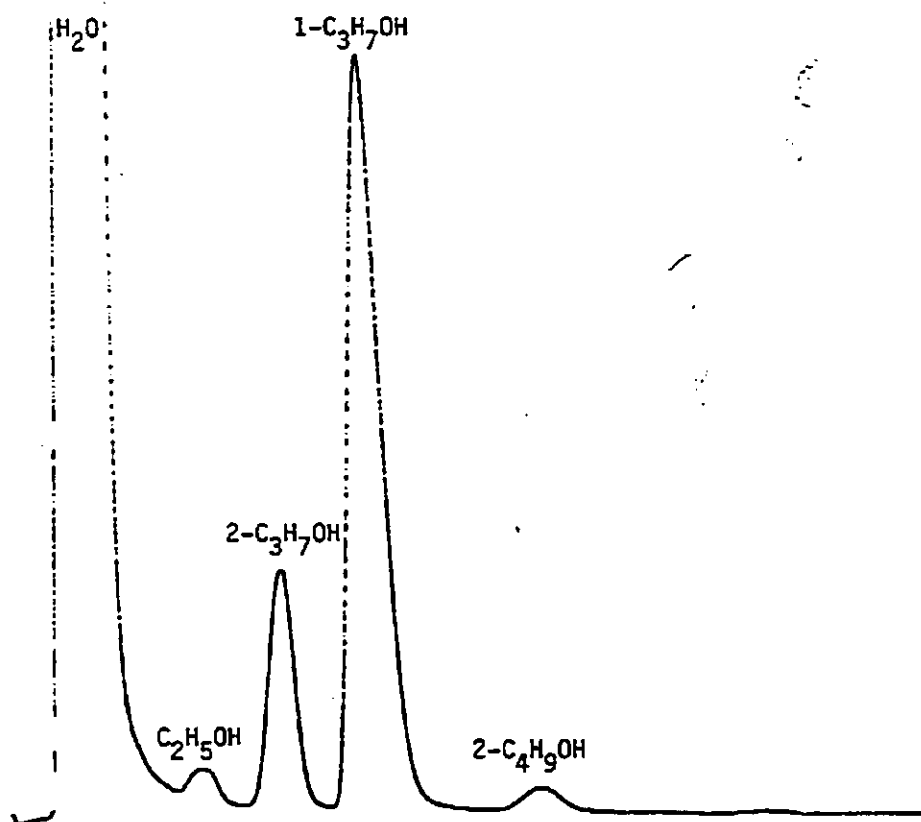


Figure H.4. Chromatogram of Sample Aqueous Product
(Sample # 080631002).

Table H.1. Sample Material Balance
(gm/hr).

Run #: 08063.

Catalyst: 1.00 gm Co/Al₂O₃ (9.3 wt.% of Co., 60-150 mesh).

Reactor: fixed-bed microreactor (static bed height - $2\frac{21}{64}$ in.).

Reaction temperature: 494.3 °K.

Reaction pressure: 1066.6 kPa.

<u>Component</u>	<u>Metered Rate</u>	<u>Measured Rate</u>
	<u>in Feed</u>	<u>in Product</u>
H ₂	0.5352	0.5063
CO	7.2575	6.8895
C ₂ H ₄	3.9916	2.8715
CO ₂	6.2142	7.0174
CH ₄	2.5401	2.5325
C ₂ H ₆	0.0	0.2085
Subtotal of gaseous product = 20.0257		
C ₆ H ₁₄	0.0	0.000144
C ₇ H ₁₆	0.0	0.000016
C ₈ H ₁₈	0.0	0.000324
C ₉ H ₂₀	0.0	0.001521
C ₁₀ H ₂₂	0.0	0.003653

Table H.1. (Cont'd.)

<u>Component</u>	<u>Metered Rate</u>	<u>Measured Rate</u>
	<u>in Feed</u>	<u>in Product</u>
C ₁₁ H ₂₄	0.0	0.005126
C ₁₂ H ₂₆	0.0	0.005347
C ₁₃ H ₂₈	0.0	0.004639
C ₁₄ H ₃₀	0.0	0.003463
C ₁₅ H ₃₂	0.0	0.002505
C ₁₆ H ₃₄	0.0	0.001797
C ₁₇ H ₃₆	0.0	0.001286
C ₁₈ H ₃₈	0.0	0.000949
C ₁₉ H ₄₀	0.0	0.000721
C ₂₀ H ₄₂	0.0	0.000551
C ₂₁ H ₄₄	0.0	0.000414
C ₂₂ H ₄₆	0.0	0.000295
C ₂₃ H ₄₈	0.0	0.000203
C ₂₄ H ₅₀	0.0	0.000141
C ₂₅ H ₅₂	0.0	0.000100
C ₂₆ H ₅₄	0.0	0.000074
C ₂₇ H ₅₆	0.0	0.000059
C ₂₈ H ₅₈	0.0	0.000056
C ₂₉ H ₆₀	0.0	0.000060
Subtotal of n-paraffins in liquid product = 0.033445		

Table H.1. (Cont'd.)

<u>Component</u>	<u>Metered Rate</u>	<u>Measured Rate</u>
	<u>in Feed</u>	<u>in Product</u>
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_5\text{H}_{11}$	0.0	0.000063
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_6\text{H}_{13}$	0.0	0.000355
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_7\text{H}_{15}$	0.0	0.001208
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_9\text{H}_{19}$	0.0	0.000942
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{10}\text{H}_{21}$	0.0	0.000895
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{11}\text{H}_{23}$	0.0	0.000780
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{12}\text{H}_{25}$	0.0	0.000589
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{13}\text{H}_{27}$	0.0	0.000413
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{14}\text{H}_{29}$	0.0	0.000313
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{15}\text{H}_{31}$	0.0	0.000248
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{16}\text{H}_{33}$	0.0	0.000201
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{17}\text{H}_{35}$	0.0	0.000166
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{18}\text{H}_{37}$	0.0	0.000150
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{19}\text{H}_{39}$	0.0	0.000133
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{20}\text{H}_{41}$	0.0	0.000121
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{21}\text{H}_{43}$	0.0	0.000118
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{22}\text{H}_{45}$	0.0	0.000105
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{23}\text{H}_{47}$	0.0	0.000095
$\text{H}_3\text{CHC}(\text{CH}_3)\text{C}_{24}\text{H}_{49}$	0.0	0.000089
Subtotal of 2-monomethyl paraffins in liquid product = 0.006985		

Table H.1. (Cont'd.)

<u>Component</u>	<u>Metered Rate</u>	<u>Measured Rate</u>
	<u>In Feed</u>	<u>in Product</u>
C ₁₁ H ₂₂	0.0	0.001908
C ₁₂ H ₂₄	0.0	0.001072
C ₁₃ H ₂₆	0.0	0.000926
C ₁₄ H ₂₈	0.0	0.000696
C ₁₅ H ₃₀	0.0	0.000511
C ₁₆ H ₃₂	0.0	0.000378
C ₁₇ H ₃₄	0.0	0.000284
C ₁₈ H ₃₆	0.0	0.000215
C ₁₉ H ₃₈	0.0	0.000168
C ₂₀ H ₄₀	0.0	0.000136
C ₂₁ H ₄₂	0.0	0.000111
C ₂₂ H ₄₄	0.0	0.000099
C ₂₃ H ₄₆	0.0	0.000083
C ₂₄ H ₄₈	0.0	0.000072
C ₂₅ H ₅₀	0.0	0.000065
C ₂₆ H ₅₂	0.0	0.000056
C ₂₇ H ₅₄	0.0	0.000047
Subtotal of α -olefins in liquid product = 0.006830		
Subtotal of unidentified organic species in liquid product = 0.003073		

Table H.1. (Cont'd.)

<u>Component</u>	<u>Metered Rate</u>	<u>Measured Rate</u>
	<u>in Feed</u>	<u>in Product</u>
C_2H_5OH	0.0	0.000009
$1-C_3H_7OH$	0.0	0.000155
$2-C_3H_7OH$	0.0	0.000022
$1-C_4H_9OH$	0.0	0.000004
H_2O	0.0	0.000905
Subtotal of aqueous product = 0.001094		
Total	20.5386	20.0772