

## References

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## **APPENDICES**

## A1. The conditions of GC used with a capillary column.

\*\*\*\*\*

3800 GC

\*\*\*\*\*

Module Address: 44

Valve Table

-----

Valve 1: Gas Sampling Valve

Initial: Fill

0.01 min: Inject

0.20 min: Fill

Front Injector Type 1079

-----

Oven Power: On

Coolant: Off

Enable Coolant at: 220 C

Coolant Timeout: 20.00 min

Temp (C)	Rate (C/min)	Hold (min)	Total (min)
250	0	0.00	0.00

Time (min)	Split State	Split Ratio
Initial	Off	Off

Middle Injector Type 1041

-----

Oven Power: On

Temperature: 250 C

Front Injector EFC Type 1

-----

Constant Column Flow: 1.0 ml/min

Middle Injector EFC Type 3

-----

Flow (ml/min)	Rate (ml/min/min)	Hold (min)	Total (min)
1.0	0.0	12.00	12.00

Column Oven

-----

Coolant: Off

Enable Coolant at: 50 C

Coolant Timeout: 20.00 min

Stabilization Time: 0.50 min

Temp (C)	Rate (C/min)	Hold (min)	Total (min)
70	0.0	12.00	12.00

## A1. (continued)

## Front TCD Detector

-----  
 Oven Power: On  
 Temperature: 170 C  
 Electronics: On  
 Filament Temp: 210 C  
 Time Constant: Slow  
 Temp Limit: 390 C  
 Carrier Gas: He

Time (min)	Range	Autozero	Polarity
Initial	0.05	yes	negative

-----

## Middle FID Detector

-----  
 Oven Power: On  
 Temperature: 250 C  
 Electronics: On  
 Time Constant: Slow

Time (min)	Range	Autozero
Initial	11	yes

-----

## Output Port A

-----  

Time (min)	Signal Source	Attenuation
Initial	Front	8

-----

## Output Port B

-----  

Time (min)	Signal Source	Attenuation
Initial	Front	8

-----

## Output Port C

-----  

Time (min)	Signal Source	Attenuation
Initial	Front	8

-----

## Data Acquisition

-----  
 Detector Bunch Rate : 4 points (10.0 Hz)  
 Monitor Length : 64 bunched points (6.4 sec)  
 Front FID/TSD Scale: 10 Volts  
 Middle FID/TSD Scale: 10 Volts  
 Rear FID/TSD Scale: 10 Volts

## A2. The conditions of GC used with a packed column.

\*\*\*\*\*

3800 GC

\*\*\*\*\*

Module Address: 44

Valve Table

-----

Valve 1: Gas Sampling Valve

Initial: Fill

0.01 min: Inject

0.20 min: Fill

Front Injector Type 1079

-----

Oven Power: On

Coolant: Off

Enable Coolant at: 220 C

Coolant Timeout: 20.00 min

Temp (C)	Rate (C/min)	Hold (min)	Total (min)
250	0	0.00	0.00

Time (min)	Split State	Split Ratio
Initial	Off	Off

-----

Middle Injector Type 1041

-----

Oven Power: On

Temperature: 250 C

Front Injector EFC Type 1

-----

Constant Column Flow: 1.0 ml/min

Middle Injector EFC Type 3

-----

Flow (ml/min)	Rate (ml/min/min)	Hold (min)	Total (min)
30.0	0.0	15.00	15.00

Column Oven

-----

Coolant: Off

Enable Coolant at: 50 C

Coolant Timeout: 20.00 min

Stabilization Time: 0.50 min

Temp (C)	Rate (C/min)	Hold (min)	Total (min)
70	0.0	15.00	15.00

## A2. (continued)

## Front TCD Detector

-----  
 Oven Power: On  
 Temperature: 170 C  
 Electronics: On  
 Filament Temp: 210 C  
 Time Constant: Slow  
 Temp Limit: 390 C  
 Carrier Gas: He

Time (min)	Range	Autozero	Polarity
Initial	0.05	yes	negative

## Middle FID Detector

-----  
 Oven Power: On  
 Temperature: 250 C  
 Electronics: On  
 Time Constant: Slow

Time (min)	Range	Autozero
Initial	11	yes

## Output Port A

-----  

Time (min)	Signal Source	Attenuation
Initial	Front	8

## Output Port B

-----  

Time (min)	Signal Source	Attenuation
Initial	Front	8

## Output Port C

-----  

Time (min)	Signal Source	Attenuation
Initial	Front	8

## Data Acquisition

-----  
 Detector Bunch Rate : 4 points (10.0 Hz)  
 Monitor Length : 64 bunched points (6.4 sec)  
 Front FID/TSD Scale: 10 Volts  
 Middle FID/TSD Scale: 10 Volts  
 Rear FID/TSD Scale: 10 Volts



**A3.** The sample of calculation of the separation factor and permeate distribution at 177 minutes.

$$\text{Separation factor of p- and m-xylenes at 177 minutes} = \frac{62.2}{63.09} \times \frac{2630}{1755} = 1.47$$

$$\text{Separation factor of o-xylene at 177 minutes} = \frac{0.89}{63.09} \times \frac{2630}{875} = 0.04$$

$$\text{Permeate distribution of p- and m-xylenes at 177 minutes} = \frac{62.2}{63.09} \times 100 = 98.59 \%$$

$$\text{Permeate distribution of o-xylene at 177 minutes} = \frac{0.89}{63.09} \times 100 = 1.41 \%$$

## VITA

Mr. Somboonsak Suttiarunrat was born on August 3, 1968 in Bangkok. He received a Bachelor Degree in Industrial Chemistry from the Department of Chemistry, Faculty of Science, King Mongkut's Institute of Technology Ladkrabang in 1991. He has been a graduate student of the Program of Petrochemistry and Polymer Science, Graduate School, Chulalongkorn University, since 1999. To date, he serves as a technical service supervisor at the TPI Polyacrylate Company Limited.

