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## **APPENDICES**



## Appendix

### A-1 % Selectivity of gas fraction and liquid fraction

$$\% \text{ Selectivity of X} = \frac{\text{concentration of X} \times 100}{\text{total concentration of fractions}}$$

$$\text{Concentration of X} = \frac{b \times c}{a}$$

a = Peak area of X in standard gas or liquid fraction

b = % molar of X in standard gas or liquid fraction

c = Peak area of X in sample products

**TableA-1** Conversion and product yield from PP waste cracking over H-MCM-22(60) at 380°C (Condition: 10%wt catalyst of PP waste, N<sub>2</sub> flow of 20 cm<sup>3</sup>/min and reaction time of 40 min)

	H-MCM-22(60) #1	H-MCM-22(60) #2	H-MCM-22(60) #3	H-MCM-22(60) (av)
Conversion <sup>a</sup> (%)	93.00	92.20	92.20	92.47
Yield <sup>b</sup> (%)				
1. gas fraction	57.00	57.00	57.20	57.07
2. liquid fraction	36.00	35.20	35.00	35.40
- % distilled oil	64.13	63.30	63.97	63.80
-% heavy oil	35.87	36.70	36.03	36.20
3. residue	7.00	7.80	7.80	7.53
- wax	4.35	5.20	5.22	4.92
- solid coke	2.63	2.60	2.59	2.61
Total volume of liquid fraction (cm <sup>3</sup> )	2.34	2.40	2.45	2.40
Liquid fraction density (g/cm <sup>3</sup> )	0.73	0.74	0.74	0.74

<sup>a</sup>Deviation within  $\pm 1.0$  %

<sup>b</sup>Deviation within  $\pm 1.0$  %

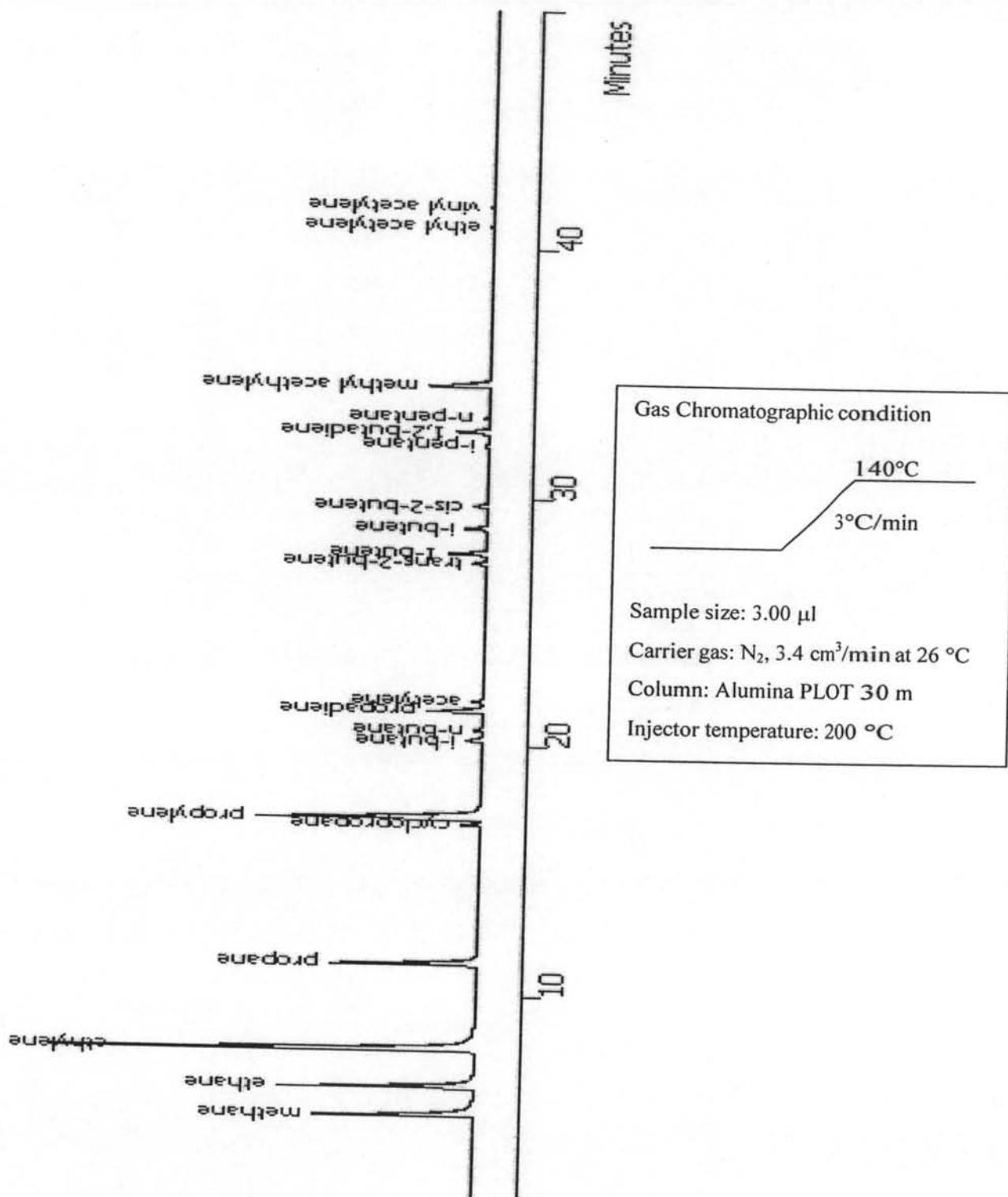
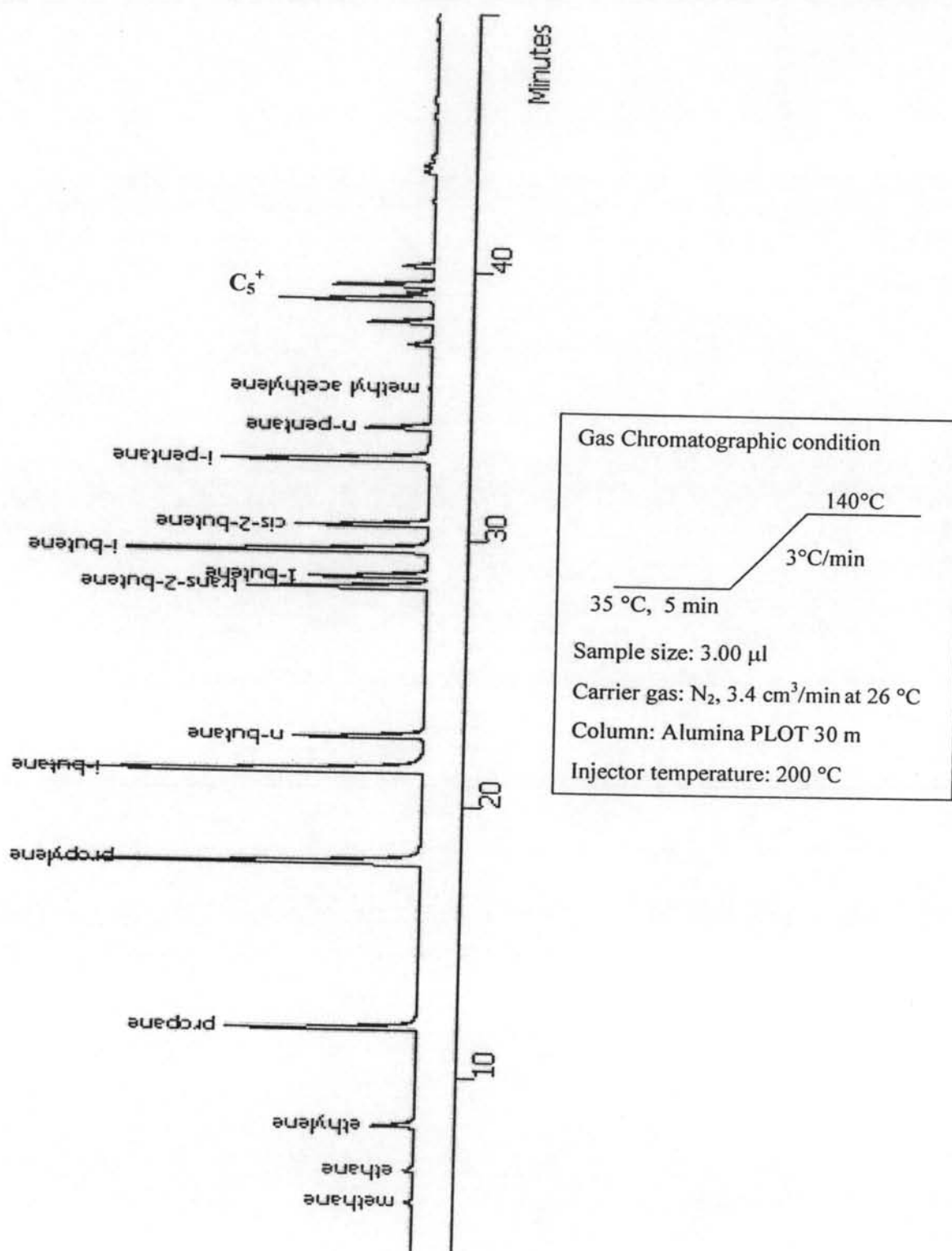


Figure A-1 Gas chromatogram of standard mixture gas.



**Figure A-2** Gas chromatogram of gas product obtained from catalytic cracking of PP waste over H-MCM-22(60) at 380°C

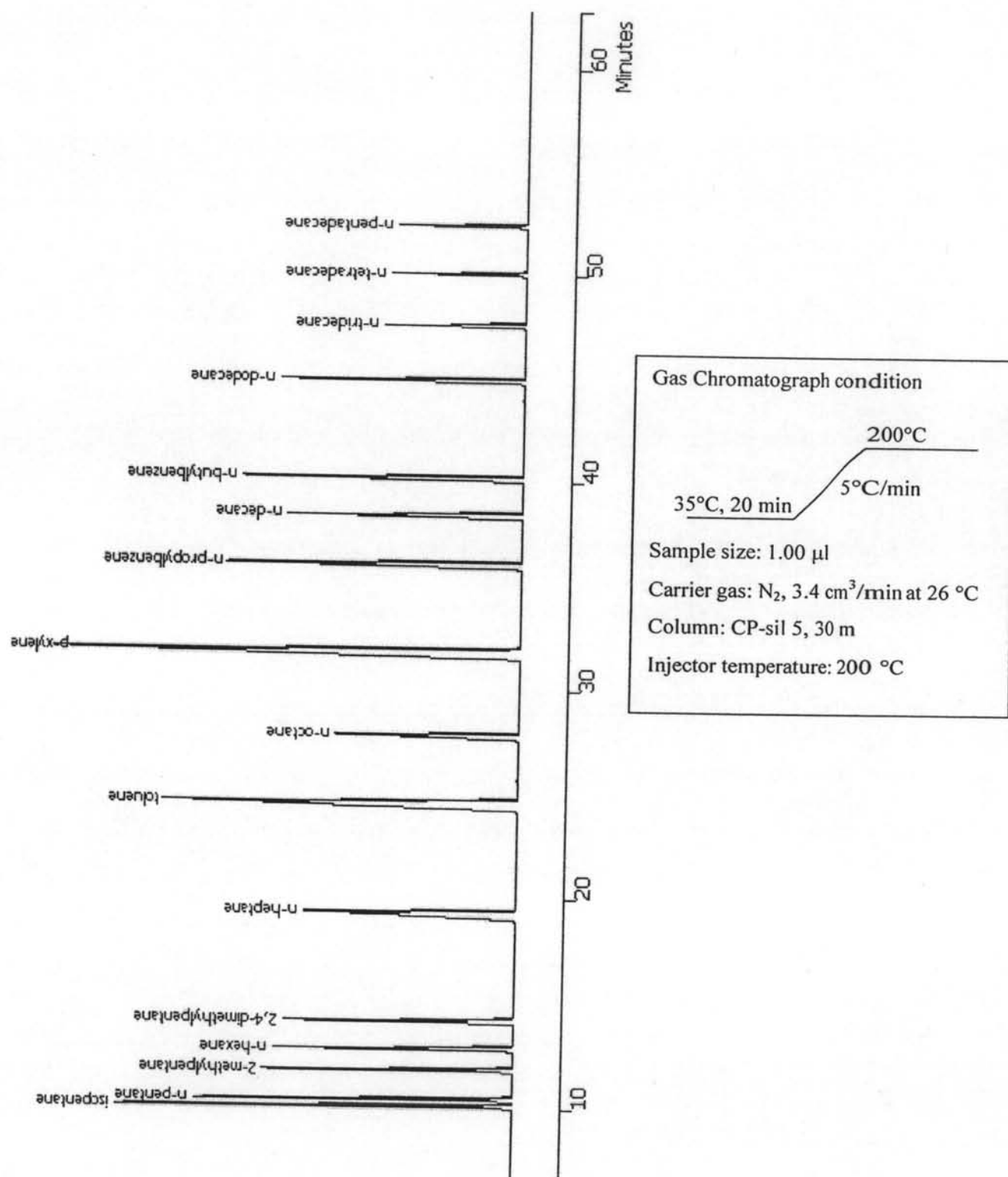
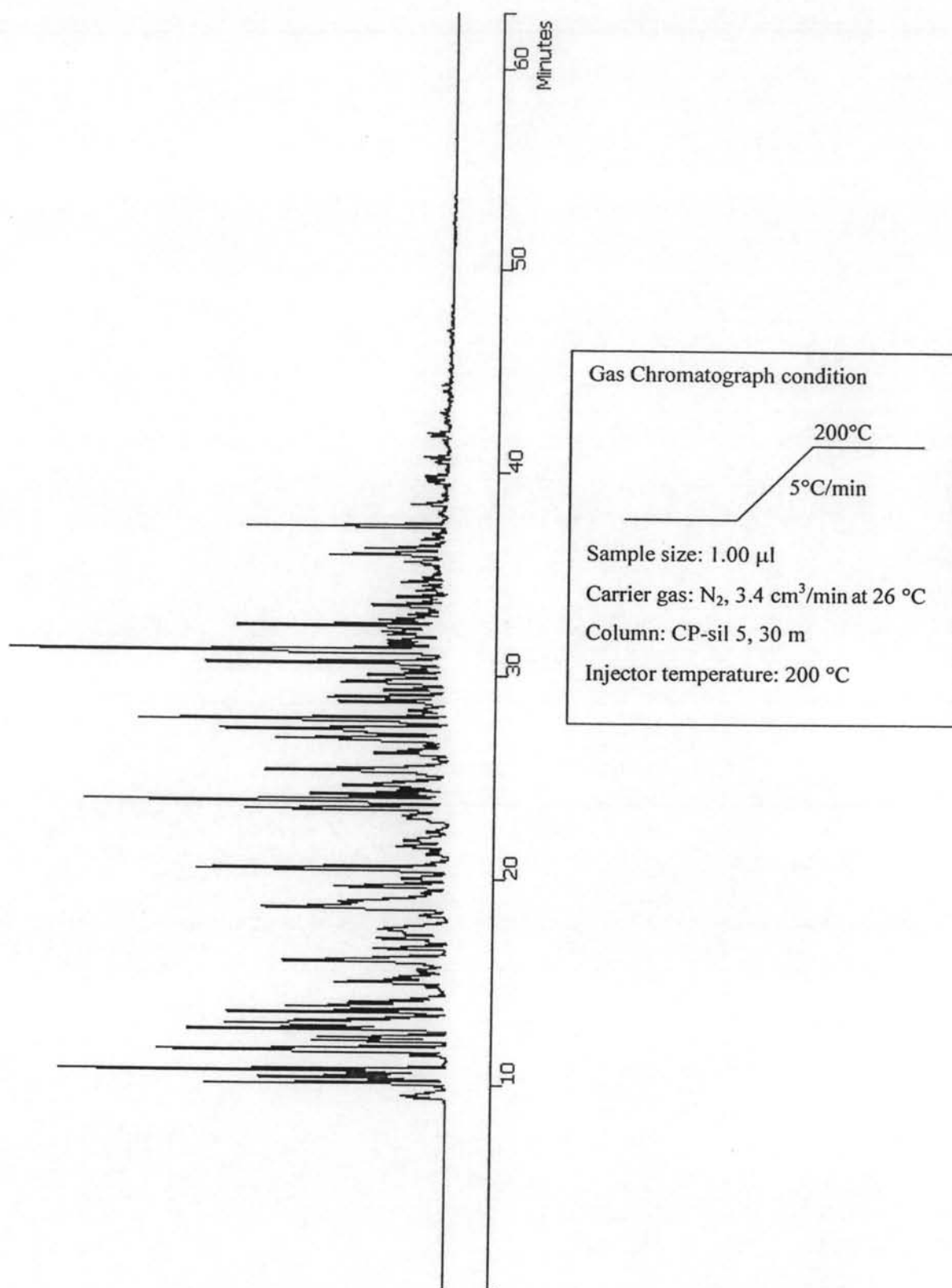


Figure A-3 Gas chromatogram of standard gasoline (SUPELCO).



**Figure A-4** Gas chromatogram of liquid product obtained from catalytic cracking of PP waste over H-MCM-22(60) at 380°C.

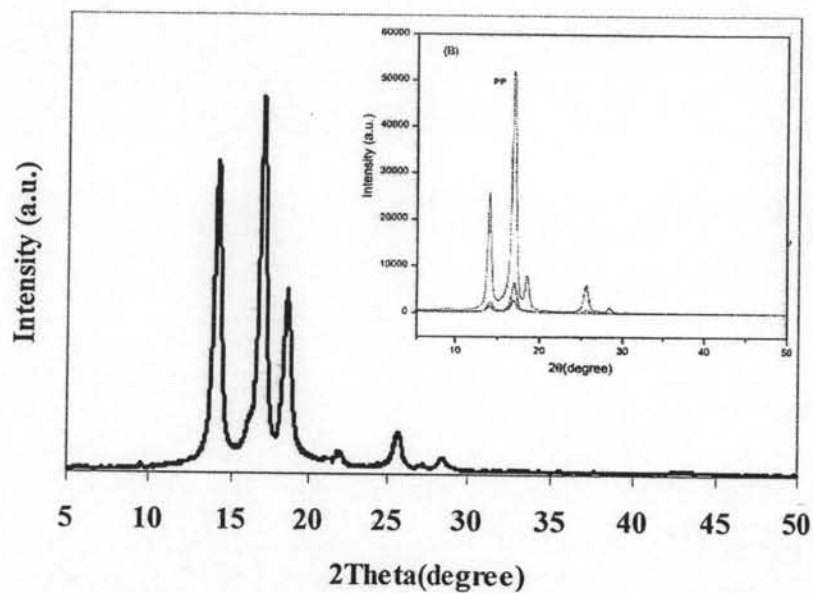


Figure A-5 XRD pattern of plastic waste. Insert shows the XRD patterns for PP waste.

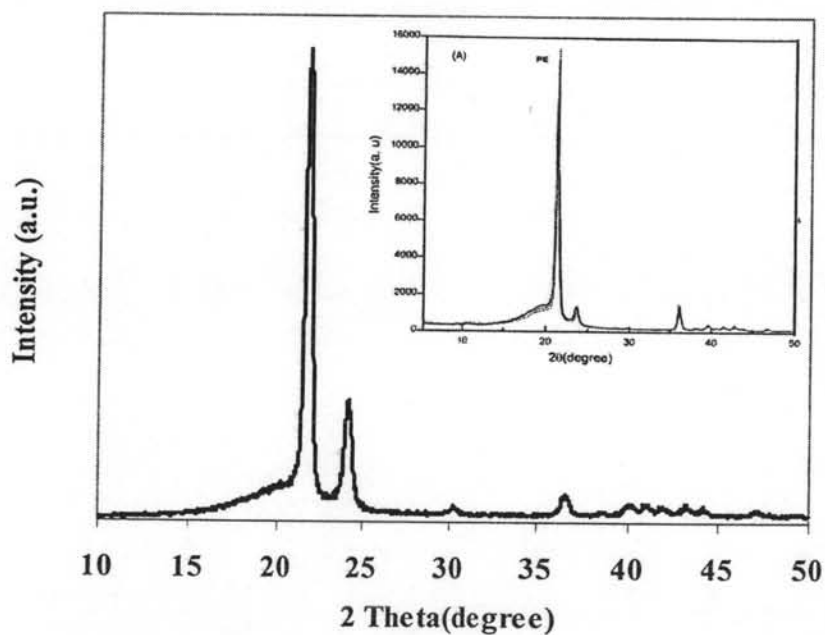


Figure A-6 XRD pattern of plastic waste. Insert shows the XRD patterns for HDPE waste.

## VITAE

Miss Narumol Kerdsa was born on August 3, 1983 in Uttaradit, Thailand. She graduated with Bachelor's Degree in Chemistry from Faculty of Science, Mahidol University in 2005. She continued her study in Petrochemistry and Polymer Science Program, Faculty of Science, Chulalongkorn University in 2005 and completed in 2008.

Her address was 50/1 Thungyang, Lublae, Uttaradit, 53210, Tel. 0837779504.