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APPENDICES

Appendix A Experimental data of gas calibration for GC-14B

Condition: Detector Current 120 mA

Temperature	°C
Column	50
Injector	120
Detector	120
TCD-T	120
Pressure	**kPa**
Carrier Pressure (P)	500
Carrier Pressure (M)	450
TCD-Ref	120

Column	Model
Alltech	CTR I
Supelco	Carboxen

1. Nitrogen

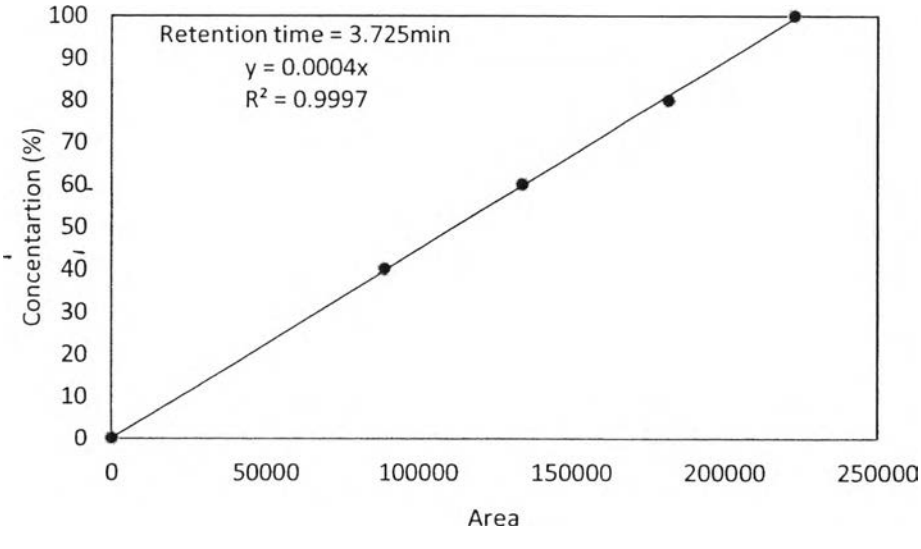

Figure A1 Relationship between area and concentration of nitrogen.

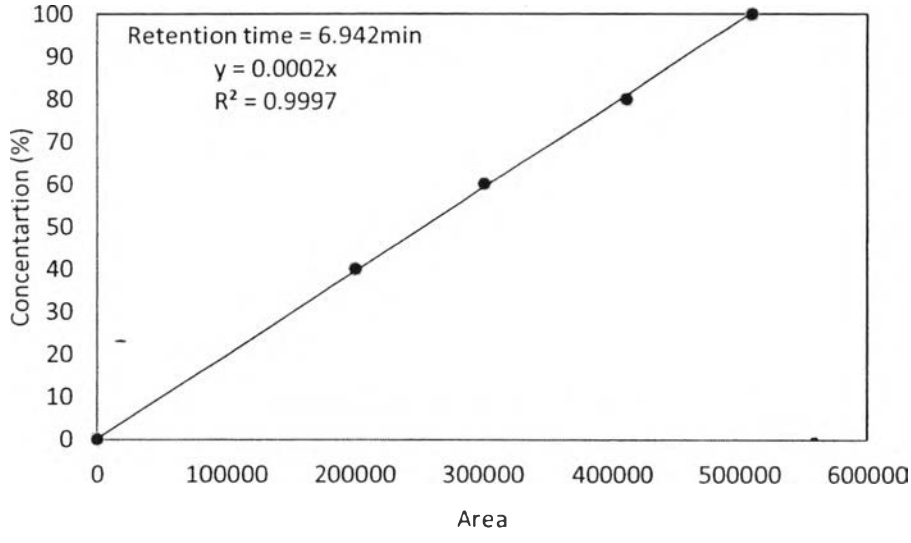

Figure A2 Relationship between area and concentration of nitrogen.

2. Hydrogen

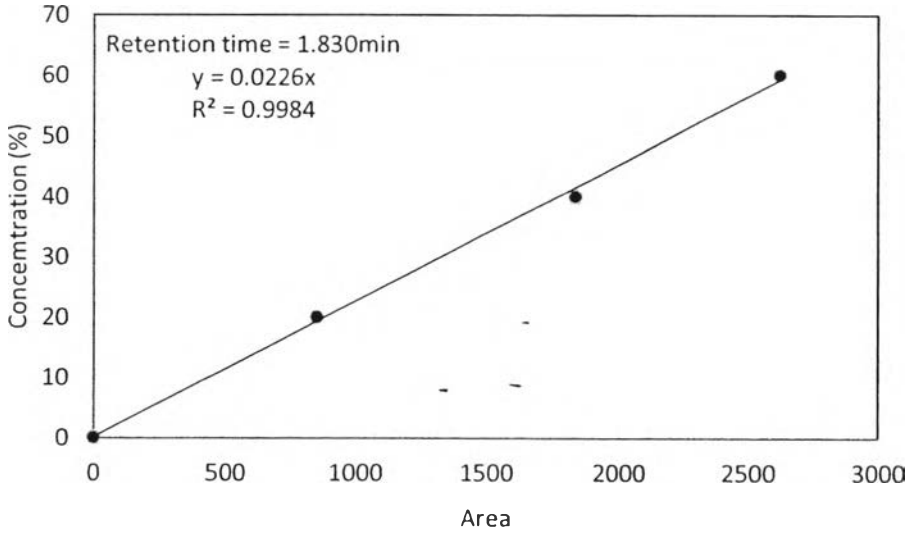

Figure A3 Relationship between area and concentration of hydrogen.

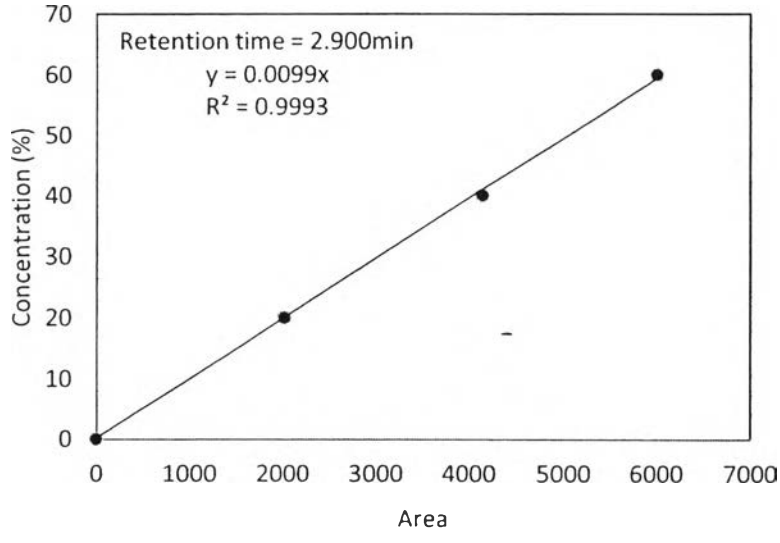

Figure A4 Relationship between area and concentration of hydrogen.

3. Carbon Dioxide

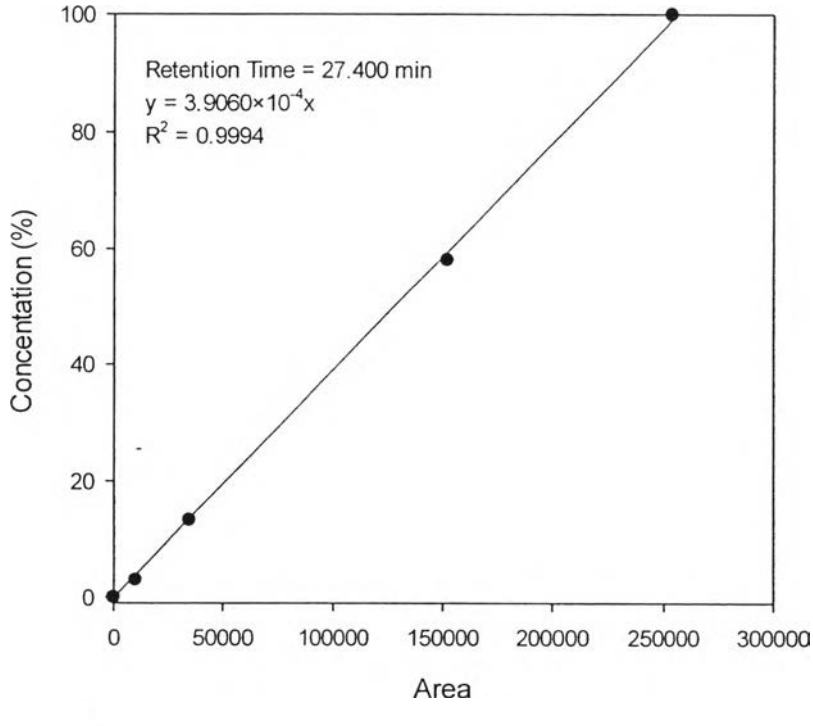

Figure A5 Relationship between area and concentration of carbon dioxide.

4. Carbon monoxide

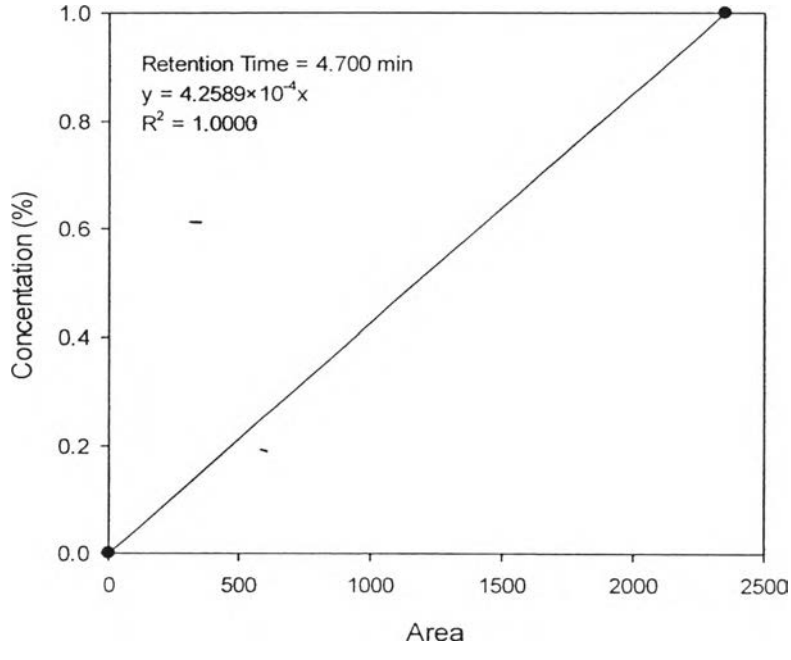

Figure A6 Relationship between area and concentration of carbon monoxide.

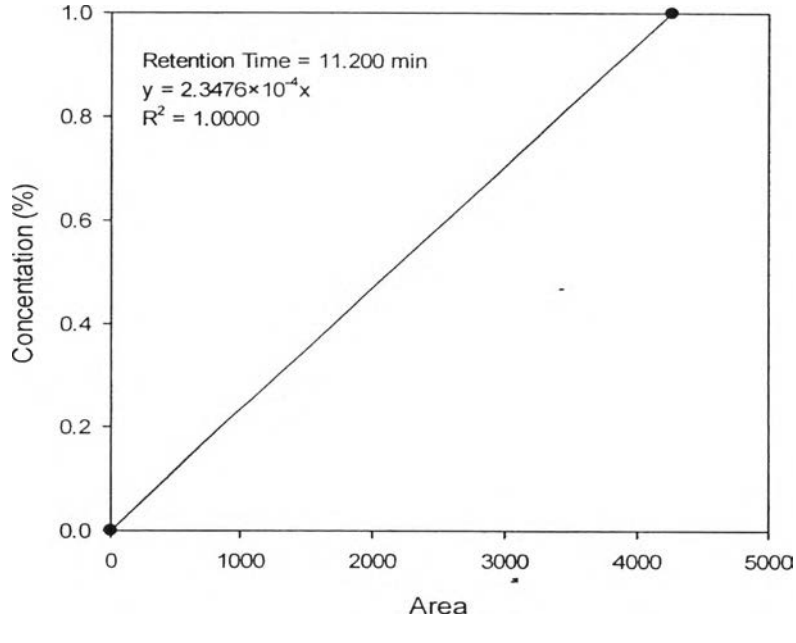

Figure A7 Relationship between area and concentration of carbon monoxide.

5. Methane

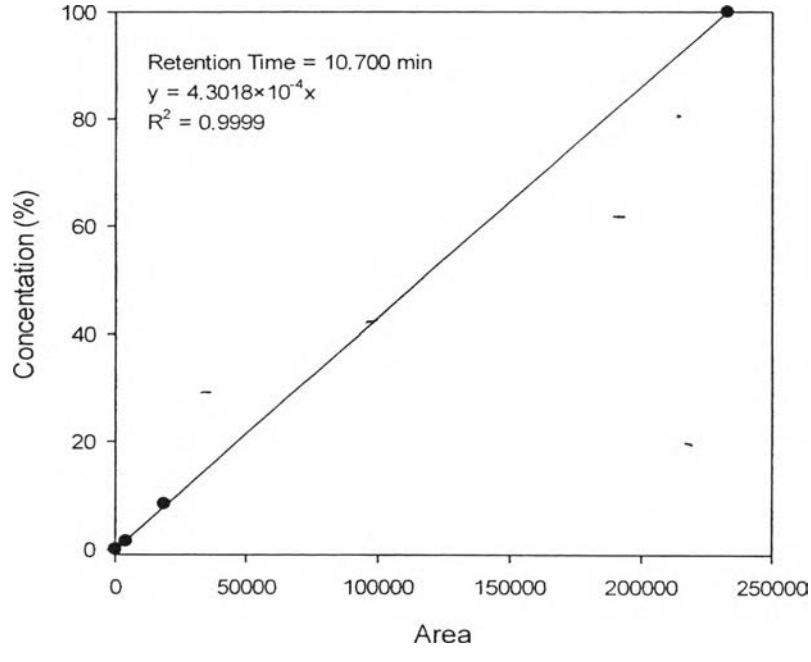

Figure A8 Relationship between area and concentration of methane.

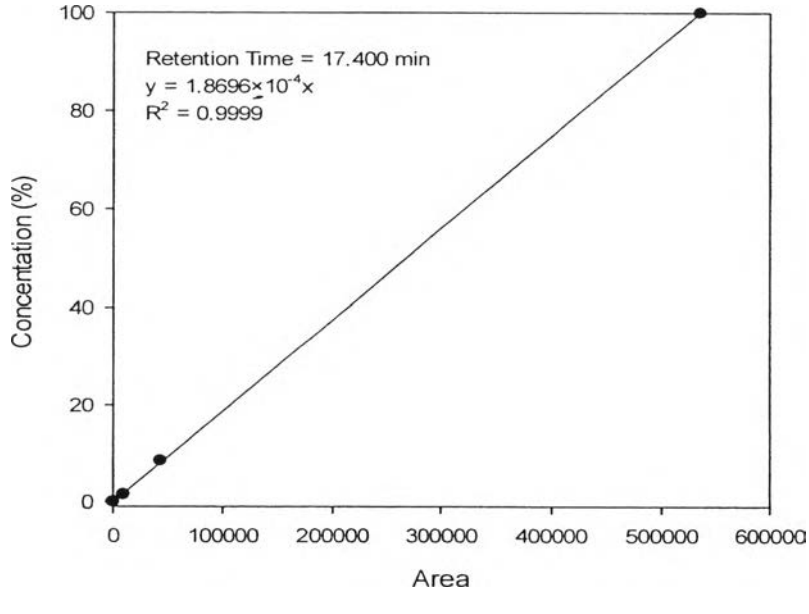

Figure A9 Relationship between area and concentration of methane.

6. Oxygen

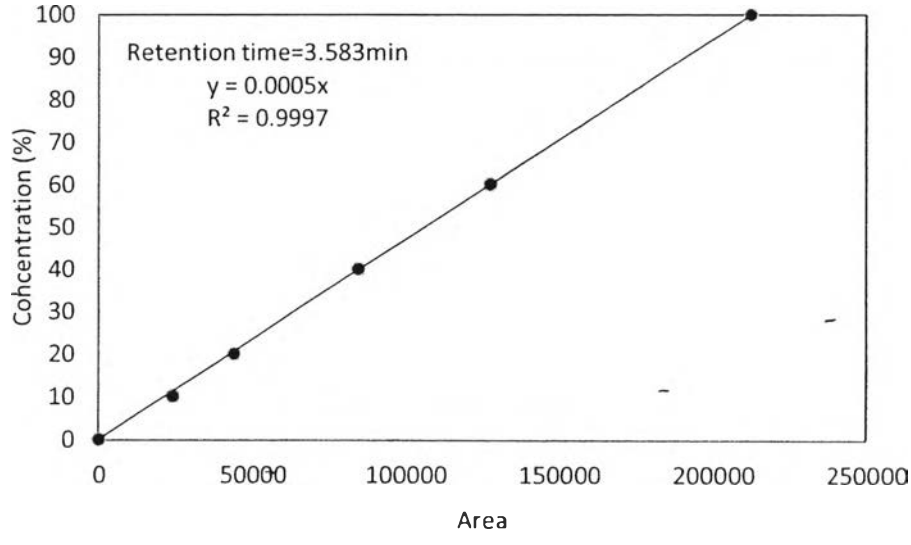

Figure A10 Relationship between area and concentration of oxygen.

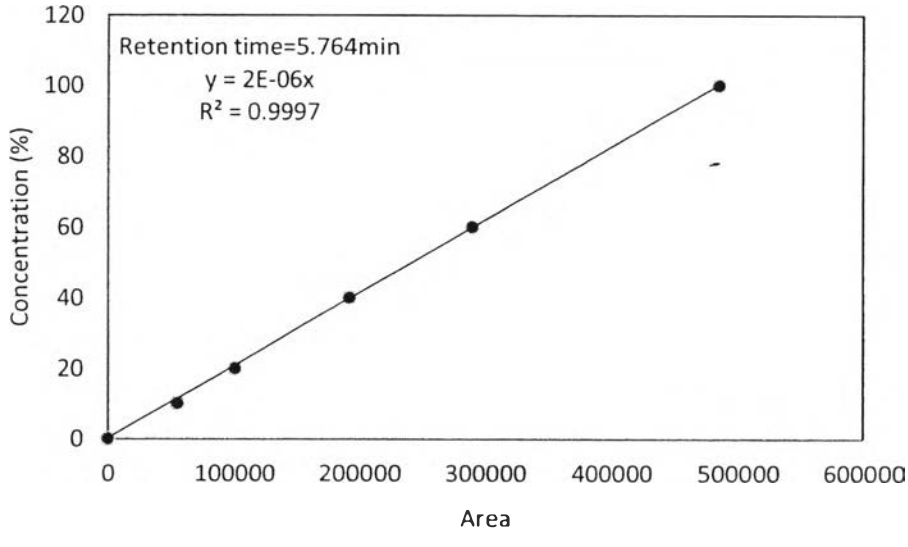

Figure A11 Relationship between area and concentration of oxygen.

Appendix B Calibration curve of Brooks 5850E mass flow controllers

1. Nitrogen

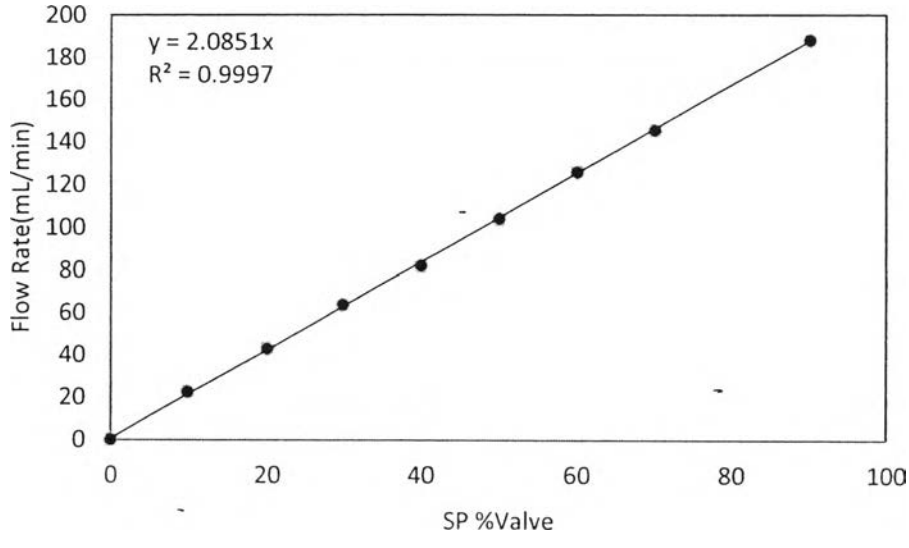

Figure B1 Relationship between set point and volumetric flow rate of nitrogen.

2. Oxygen

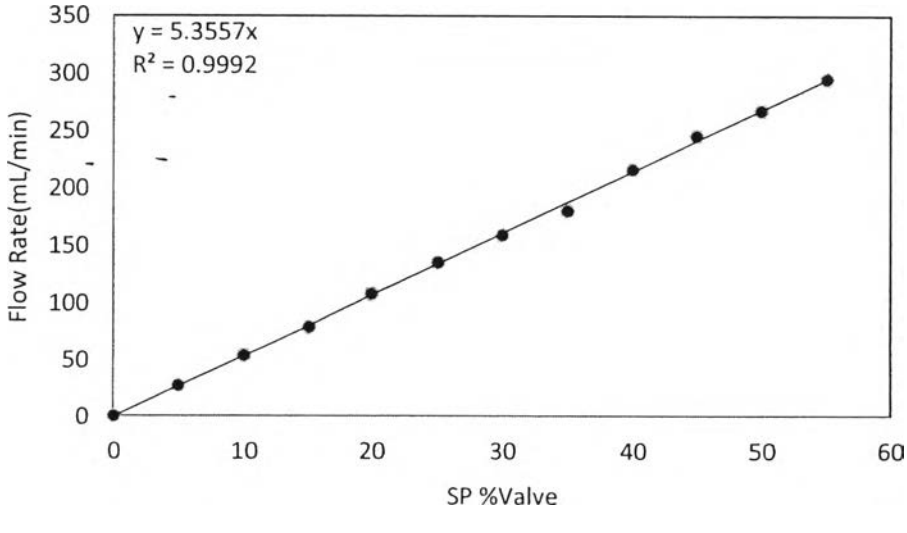

Figure B2 Relationship between set point and volumetric flow rate of oxygen.

3. Hydrogen

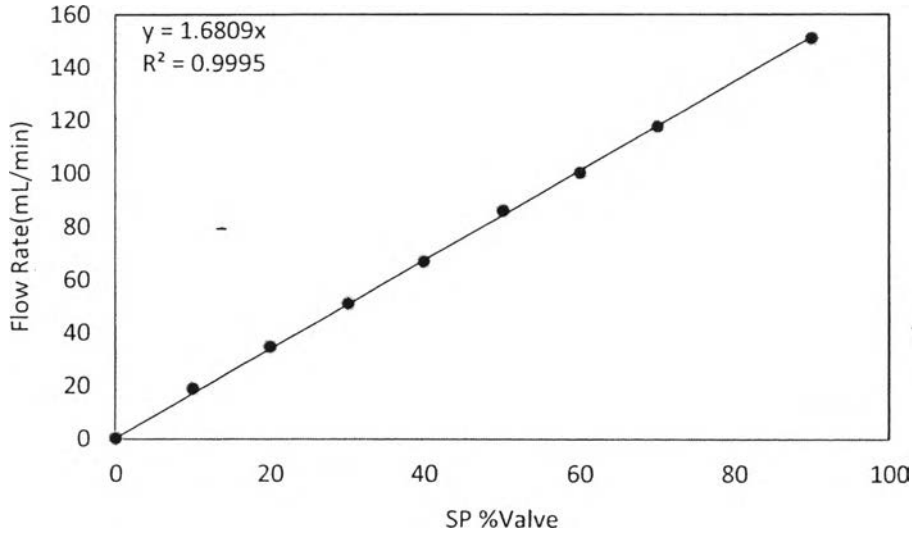

Figure B3 Relationship between set point and volumetric flow rate of hydrogen.

Appendix C Calibration curve of Eldex ReciPro Liquid Metering Pumps

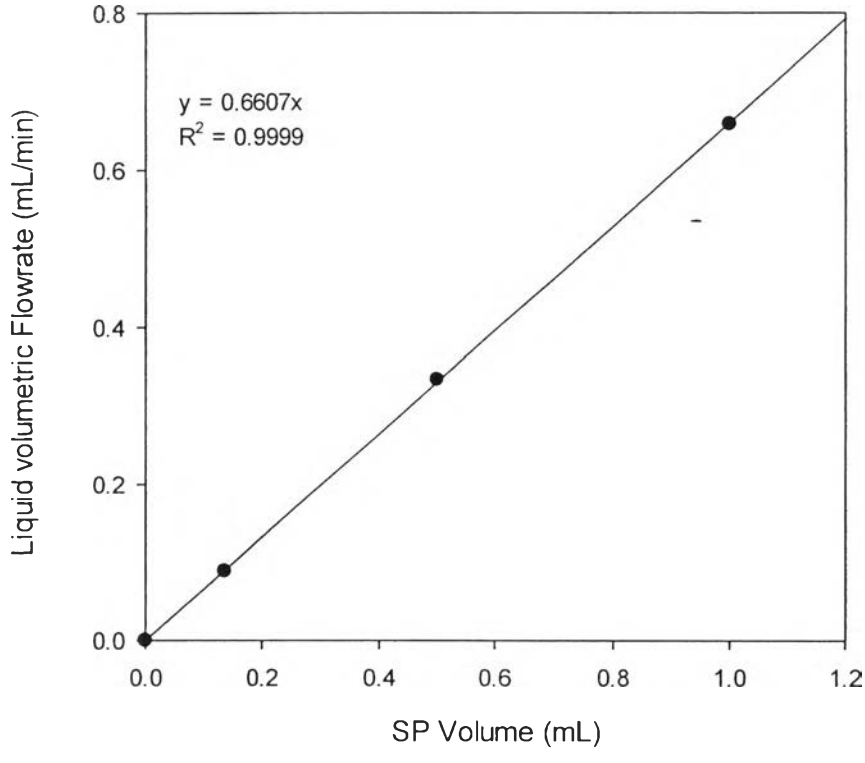

Figure C1 Relationship between volume set point and volumetric flow rate.

Appendix D Experimental data of catalytic activity tests

Table D1 Catalytic activity test of blank test on autothermal steam reforming at T = 650°C, S/C ratio = 6, ATR condition and GHSV = 65,000 h^{-1}

Catalyst	**Blank**
Yield H_2 (%)	0
Yield CO (%)	0
Yield CO_2 (%)	0
Yield CH_4 (%)	0
C-C Breakage Conversion(%)	0

Table D2 Catalytic activity test of autothermal steam reforming at different temperature, S/C ratio = 6, ATR condition and GHSV = 65,000 h^{-1}

Temperature (°C)	**550**	**600**	**650**	**700**
Yield H_2 (%)	40.21	47.76	71.16	70.76
Yield CO (%)	6.61	6.9	12.4	15.31
Yield CO_2 (%)	41.88	43.67	56.03	56.91
Yield CH_4 (%)	0.46	0.99	1.49	1.85
C-C Breakage Conversion(%)	48.95	51.56	69.92	74.07

Table D3 Catalytic activity test at different oxygen-to-acetic acid molar ratio, S/C ratio = 6, T = 650°C, ATR condition and GHSV = 65,000 h^{-1}

Oxygen/Acetic acid Molar ratio	**0**	**0.2**	**0.3**	**0.4**
Yield H2 (%)	77.81	75.54	72.6	60.07
Yield CO (%)	11.58	12.36	11.96	9.02
Yield CO2 (%)	50.3	52.6	54.03	58.19
Yield CH4 (%)	1.81	1.29	1.33	1.36
C-C Breakage Conversion(%)	63.69	66.25	67.32	68.57
Amount of carbon deposit (%wt)	18.08	16.85	14.98	12.82

Table D4 Catalytic activity test of autothermal steam reforming at different oxygen-to - steam ratio at 650 °C, ATR condition and GHSV = 65,000 h^{-1}

Oxygen/Steam Molar ratio	**0.017**	**0.027**	**0.055**
Yield H_2 (%)	72.68	71.16	68.33
Yield CO (%)	10.43	12.4	14.02
Yield CO_2 (%)	64.68	56.03	48.33
Yield CH_4 (%)	1.86	1.49	1.98
C-C Breakage Conversion(%)	76.97	69.92	64.33
Amount of carbon deposit (%wt)	8.01	14.79	18.11

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