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APPENDIX

Appendix A Product Analysis

The chemical products of CuZnO/Al₂O₃ on 10 h TOS were analyzed by gas chromatograph equipped with an FID detector (Agilent 6890) to identify peaks of compositions of feedstocks, intermediates, and products. A chromatogram of glycerol dehydroxylation to propylene glycol analyzed is shown in figure A1. Moreover, other by-products were analysed by GC-TOF, as shown in table A1.

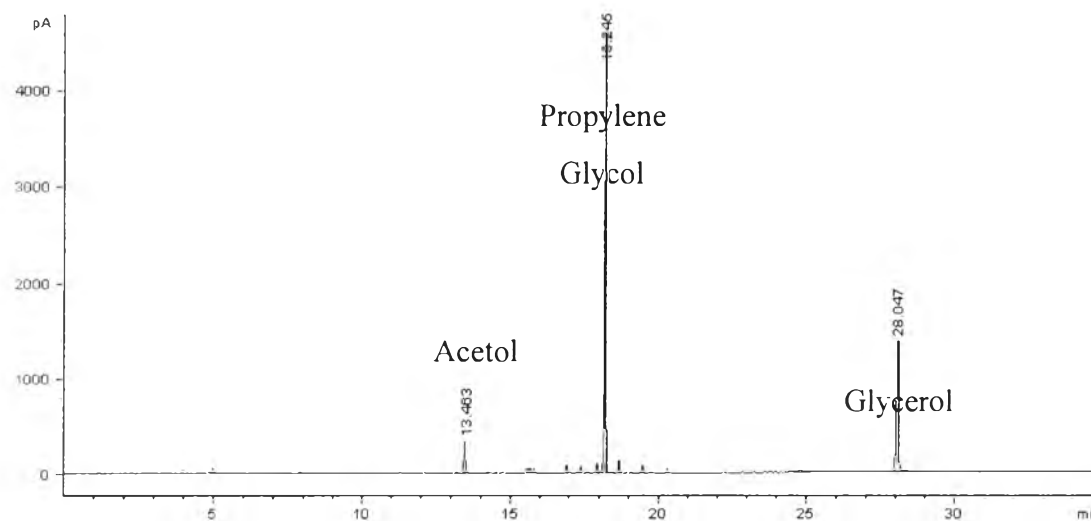


Figure A1 Chromatogram of CuZnO/Al₂O₃ on 10 h TOS. analyzed by a GC/FID (Agilent GC 6890)

Table A1 By-product of CuZnO/Al₂O₃ on 10 h TOS. analyzed by a GC-TOF

Name	Formula	Similarity
Acetone	C ₃ H ₆ O	685
Methyl Alcohol	CH ₄ O	897
Benzene	C ₆ H ₆	898
Isopropyl Alcohol	C ₃ H ₈ O	814
Ethanol	C ₂ H ₆ O	744
1-Propanol	C ₃ H ₈ O	866
2,3-Hexanedione	C ₆ H ₁₀ O ₂	870

Name	Formula	Similarity
Cyclohexanone	C ₆ H ₁₀ O	854
3-Methylcyclopentanone	C ₆ H ₁₀ O	836
4-Penten-2-ol	C ₅ H ₁₀ O	745
Acetol	C ₃ H ₆ O ₂	891
3-Pentanol	C ₅ H ₁₂ O	760
Butanoic acid, 2-propenyl ester	C ₇ H ₁₂ O ₂	768
2-Hydroxy-3-pentanone	C ₅ H ₁₀ O ₂	820
2-methy-Cyclopenten-1-one	C ₆ H ₈ O	872
5-hydroxy-4-octanone	C ₈ H ₁₆ O ₂	809
4-Penten-2-ol	C ₅ H ₁₀ O	700
5-Hydroxy-4-octanone	C ₈ H ₁₆ O ₂	792
Acetic acid	C ₂ H ₄ O ₂	810
1-hydroxy,propan-2-one	C ₃ H ₆ O ₂	750
Propylene Glycol	C ₃ H ₈ O ₂	769
Propanoic acid, 1-methylethyl ester	C ₆ H ₁₂ O ₂	744
5-Hydroxy-4-octanone	C ₈ H ₁₆ O ₂	715
RS-2,3-hexanediol	C ₆ H ₁₄ O ₂	780
Glycerin	C ₃ H ₈ O ₃	895
n-Caproic acid vinyl ester	C ₈ H ₁₄ O ₂	746

The chemical standards were analysed by GC/FID detector (Agilent 6890) to identify peaks of compositions of feedstocks, intermediates, and products. The retention time and response factor for the standards are shown in Table A2.

Table A2 Retention times and response factors of standard chemicals analyzed by a GC/FID (Agilent GC 6890)

Standard chemical	Retention time (min)	Response factor
Hexane	1.43	1.00
Acetone	2.50	0.35
Methanol	3.78	0.13
2-propanol	4.57	0.37
Ethanol	4.74	0.26
1-propanol	7.65	0.42
Acetol	13.30	0.54
Propylene glycol	18.07	0.27
Ethylene glycol	18.60	0.16
Glycerol	27.73	0.25

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