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APPENDICES

Appendix A Feedstock Analysis

The palm fatty acid distillate (PFAD) were analysed by gas chromatograph equipped with an FID detector (Agilent 6890) to identify peaks of compositions of feedstock. A chromatogram of PFAD compositions is shown in Figure A1. The compositions of PFAD are shown in Table A.1 analysed by a GC-FID.

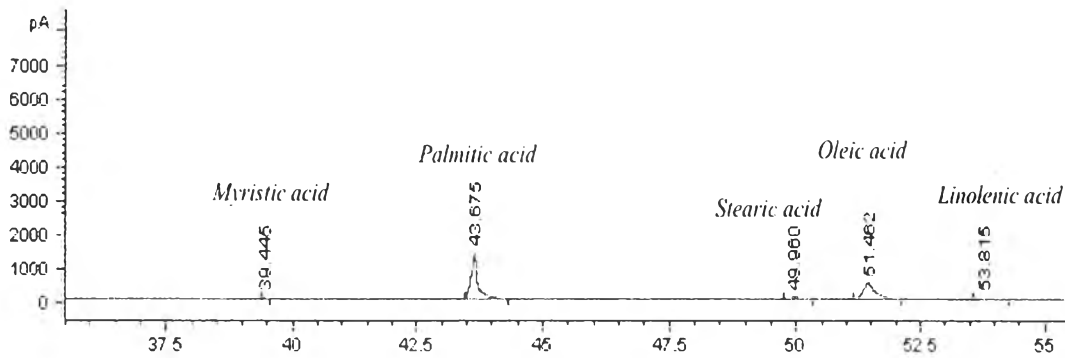


Figure A1 Chromatogram of PFAD analysed by a GC/FID (Agilent GC 6890).

Table A1 Compositions of PFAD analysed by a GC-FID

Name	Composition%
Myristic acid	1.0
Palmitic acid	53.4
Stearic acid	3.3
Oleic acid	35.4
Ethanol	6.8
Linolenic acid	1.0

Appendix B The PFAD Conversion and Product Yields

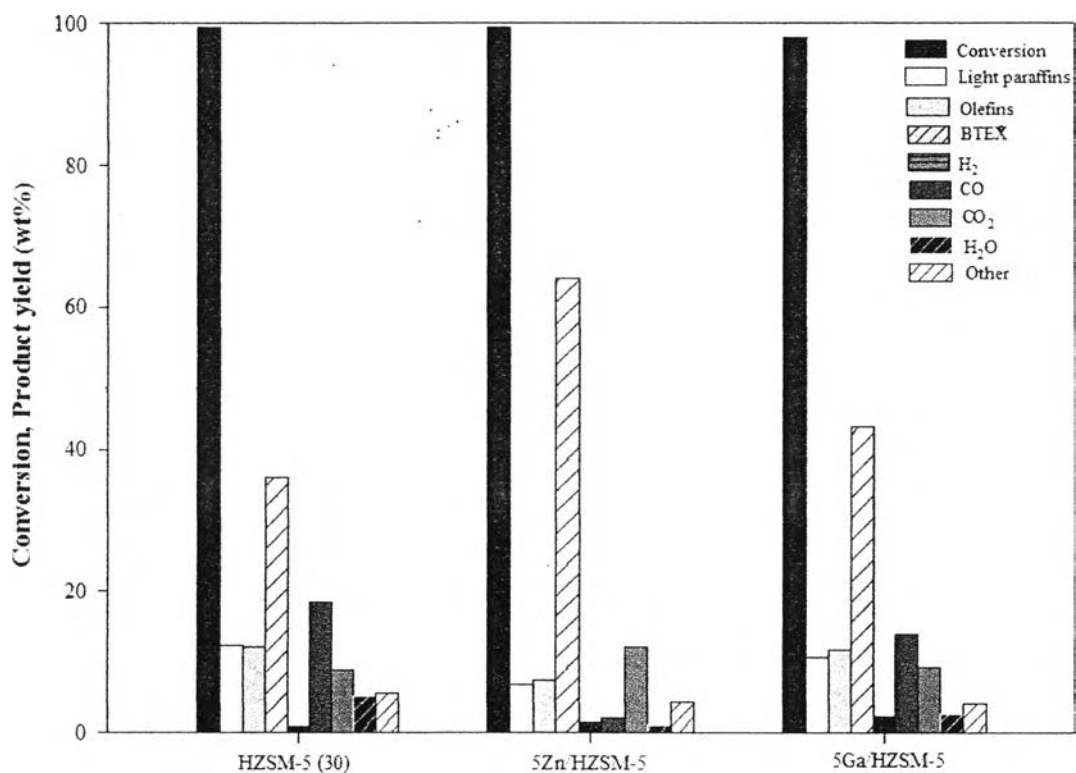


Figure B1 Effect of Zn and Ga loading on HZSM-5 zeolites on the PFAD conversion, and product yield. (Reaction conditions: 500 °C under atmospheric pressure, and $WHSV = 5 \text{ h}^{-1}$)

Appendix C Stability of the Catalysts

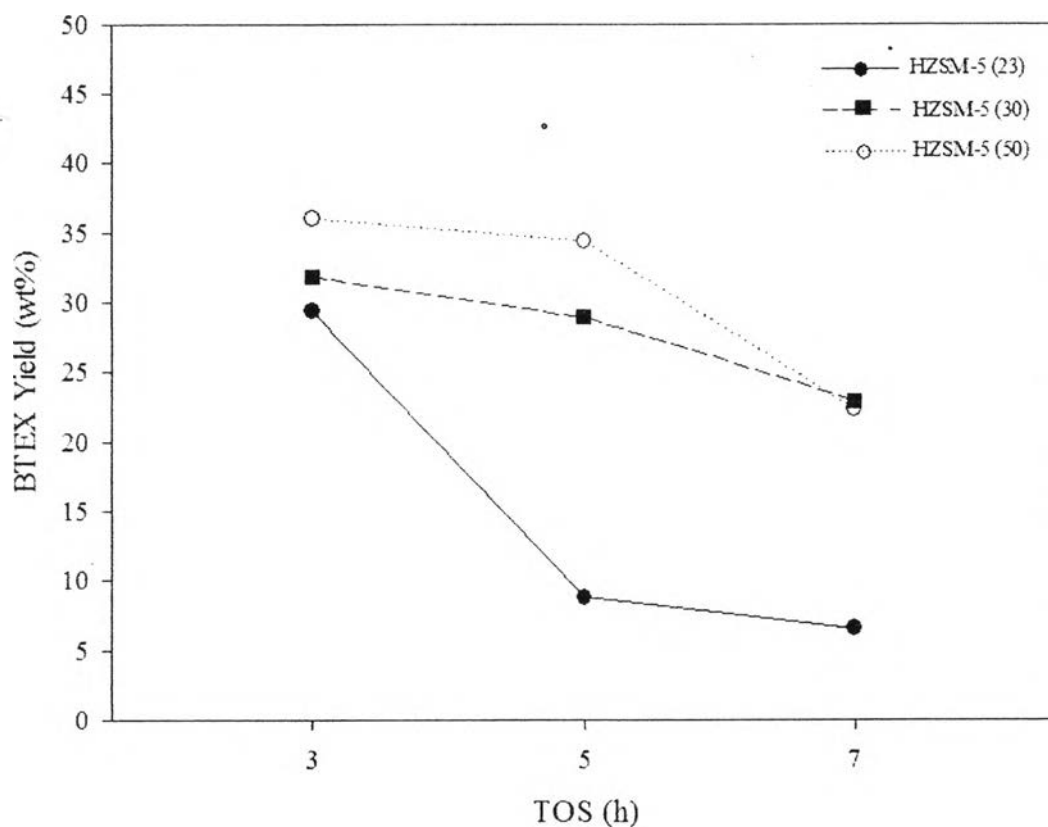


Figure C1 Effect of $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio of HZSM-5 zeolites on the PFAD conversion, and product yield. (Reaction conditions: 500 °C under atmospheric pressure, and $WHSV = 5 \text{ h}^{-1}$)

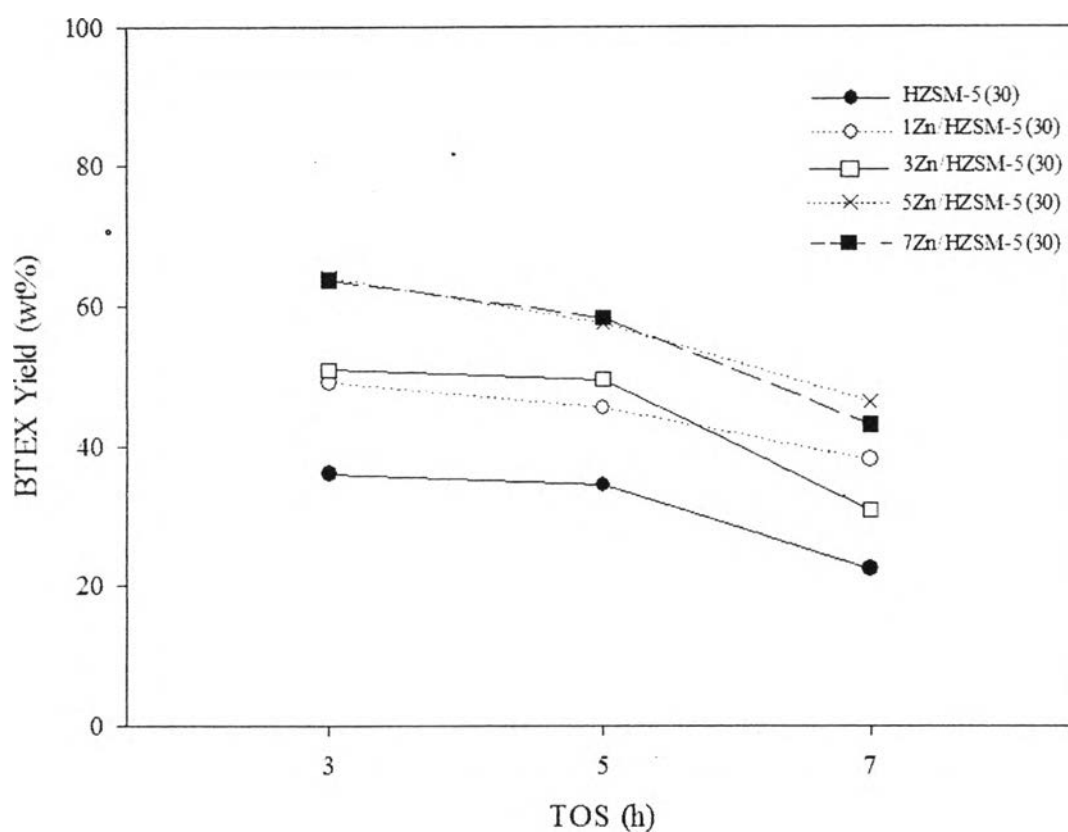


Figure C2 Effect of Zn loading on HZSM-5 zeolite on the PFAD conversion, and product yield. (Reaction conditions: 500 °C under atmospheric pressure, and $WHSV = 5 h^{-1}$)

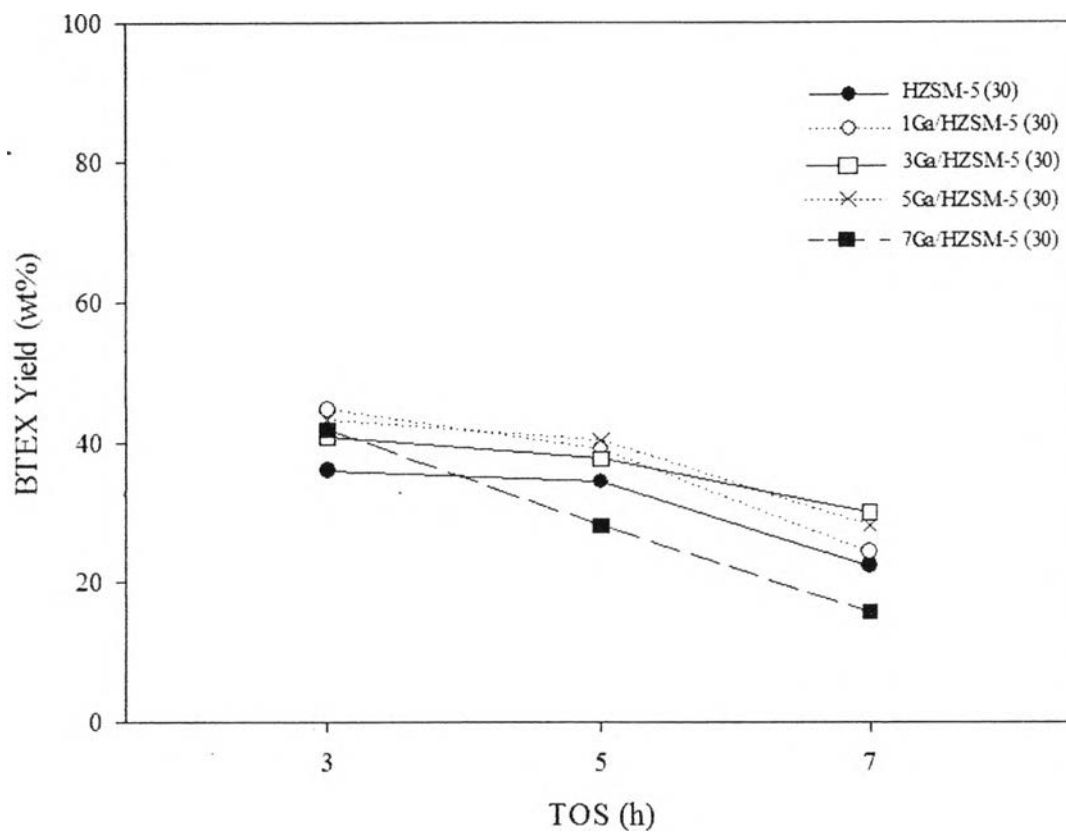


Figure C3 Effect of Ga loading on HZSM-5 zeolite on the PFAD conversion, and product yield. (Reaction conditions: 500 °C under atmospheric pressure, and $WHSV = 5 h^{-1}$)

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Presentations:

1. Anutamjarikun, S.; Tamiyakul, S.; and Jongpatiwut, S. (2015, April 21) Aromatization of palm fatty acid distillate (PFAD) over Zn-Promoted HZSM-5 catalysts. Proceedings of the 6th Research Symposium on Petrochemicals and Materials Technology and the 21th PPC Symposium on Petroleum, Petrochemicals, and Polymers, Bangkok, Thailand.
2. Anutamjarikun, S.; Tamiyakul, S.; and Jongpatiwut, S. (2015, June 21-24) Effect of Ga and Zn on the conversion of palm fatty acid distillate (PFAD) to aromatics. Paper presented at 5th International Colloids Conference 2015, Amsterdam, Netherland.