

Florida Institute of Technology

Scholarship Repository @ Florida Tech

Chemistry and Chemical Engineering Student
Publications

Department of Chemistry and Chemical
Engineering

4-2016

Production of Propylene from Methanol

Khalid Almansoori

Abdullah Kurdi

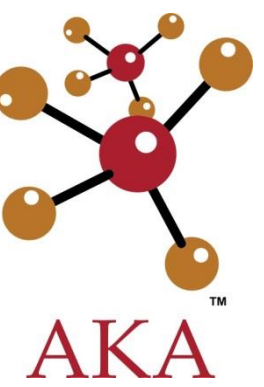
Nasser Almakhamari

Follow this and additional works at: https://repository.fit.edu/cce_student

Production of Propylene from Methanol

Khalid **A**mansoori, Abdullah **K**urdi, Nasser **A**lmakhmari

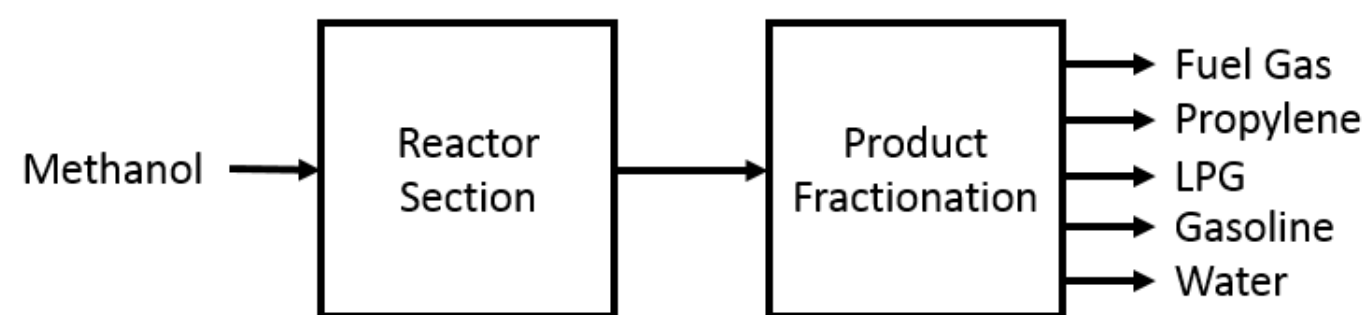
Faculty Advisor: Dr. Jonathan Whitlow, Dept. of Chemical Engineering, Florida Institute of Technology



Abstract

The goal of this project is to design and simulate a chemical plant that will produce polymer grade propylene. The following proposed production plant is to produce 500,000 tons of propylene annually using methanol as the feed and mordenite zeolite (HMOR) catalyst in the MTP reactor. Simulation of the plant was performed using Aspen Plus V8.8.

Block Flow Diagram:



Main Reactions:

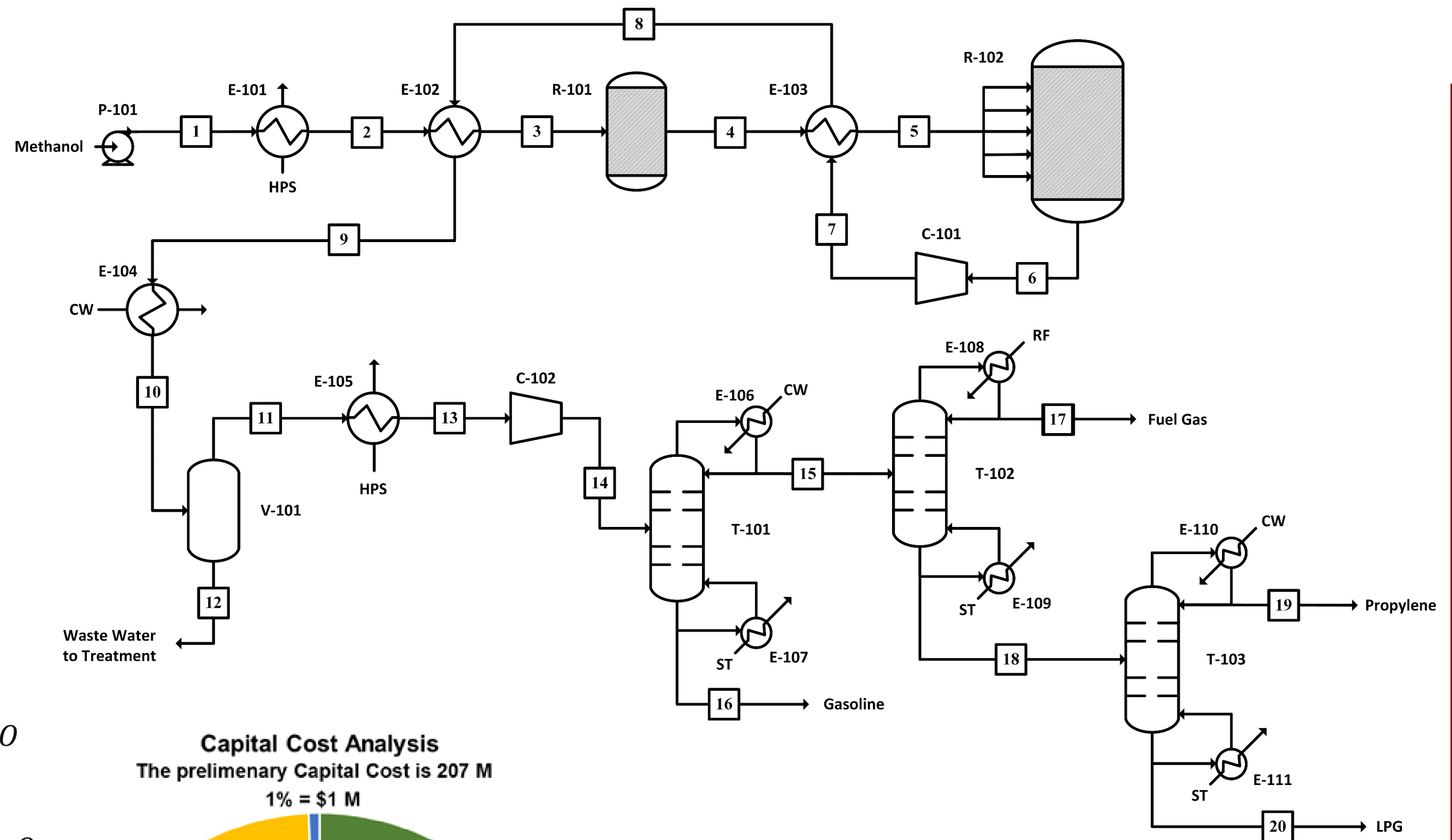
- Methanol to DME: $2CH_3OH \rightarrow CH_3OCH_3 + H_2O$
- DME to Ethylene: $CH_3OCH_3 \rightarrow C_2H_4 + H_2O$
- DME to Propylene: $3CH_3OCH_3 \rightarrow 2C_3H_6 + 3H_2O$

Specification:

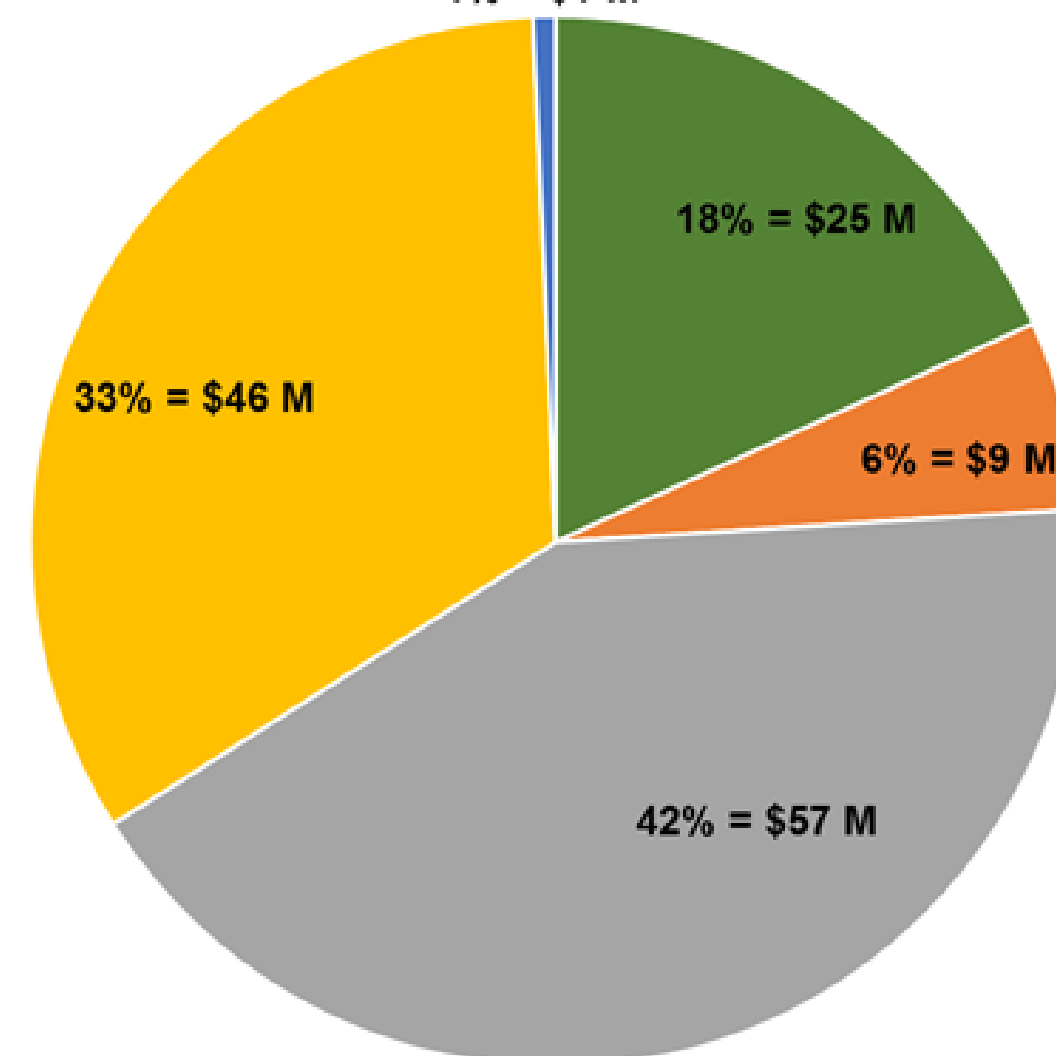
- Feed of Methanol = 350,000 kg/hr
- Propylene Production = 56,624 kg/hr
- Ethylene Production = 6,586 kg/hr
- LPG Production = 32,066 kg/hr
- Gasoline Production = 56,617 kg/hr

Acknowledgments:

Special thanks to Dr. Whitlow, Dr. Tomadakis, and Dr. Brenner for their help. We also extend our gratitude to the rest of the chemical engineering department for their support.



Capital Cost Analysis
The preliminary Capital Cost is 207 M
1% = \$1 M



■ Vessels ■ Heat Exchangers and Pumps ■ Compressors ■ Columns ■ Reactors

Equipment			
ID	Name	ID	Name
P-101	Pump	E-110	Condenser
E-101	Vaporizer	E-111	Reboiler
E-102	Heat Exchanger	R-101	DME Reactor
E-103	Heat Exchanger	R-102	MTP Reactor
E-104	Cooler	V-101	Flash Separator
E-105	Heater	C-101	Compressor
E-106	Condenser	C-102	Multi-stage Compressor
E-107	Reboiler	T-101	C ₄ -C ₅ + Splitter
E-108	Condenser	T-102	Deethanizer Column
E-109	Reboiler	T-103	Propylene-LPG Splitter



NORTHROP GRUMMAN

Engineering & Science
Student Design Showcase
at Florida Institute of Technology

