

# Abstract

This is your silly abstract here.

**Keywords:** Silly, keywords

# **Summary for Lay Audience**

Here is your Summary for Lay Audience.

# **Co-Authorship Statement**

Your Co-Authorship Statement here.

# Acknowledgements

Here is your acknowledgements.

First and foremost, I would like to express my deepest gratitude to my main supervisor...

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# List of Abbreviations, Symbols, and Nomenclature

## Abbreviations

CDF Cumulative distribution function

CFB Circulating fluidized bed

CFD Computational fluid dynamics

FCC Fluid catalytic cracking

PDF Probability distribution function

## Subscripts

g Gas phase

s Solids phase

## Symbols (greek letters and others)

$\Gamma$  Mass diffusivity, kg/m/s

$\mu$  Viscosity, kg/m/s

$\rho$  Density, kg/m<sup>3</sup>

## Symbols

$A$  Area, m<sup>2</sup>

$D$  Diameter, m

$H$  Height, m

# **Chapter 1**

## **Introduction**

Here is your first chapter: Introduction.

### **1.1 Background**

Your background (Deng et al., 2017).

### **1.2 Research objectives**

The overall objective is ...

### **1.3 Thesis structure**

This thesis follows the integrated-article format as outlined in the thesis guide of Western University. The thesis is organized as follows:

## References

Deng, Z., Xia, Y., Long, B., & Ding, Y. (2017). Volumetric properties of diisopropyl ether with acetone at temperatures from 283.15 K to 323.15 K: An experimental and theoretical study. *Journal of Molecular Liquids*, 243, 257–264.

## **Chapter 2**

### **Main Chapter 1**

#### **2.1 Introduction**

This chapter comprises four parts.

#### **2.2 Numerical models**

##### **2.2.1 Development of the reactive transport model**

The ozone mass transport equation in the gas phase can be described as follows:

$$\frac{\partial}{\partial t} \left( \varepsilon_g \rho_g Y_g^{O_3} \right) + \quad (2.1)$$

#### **2.3 Setups for micro fixed-bed reactor simulations**

Figure 2.1 shows ...

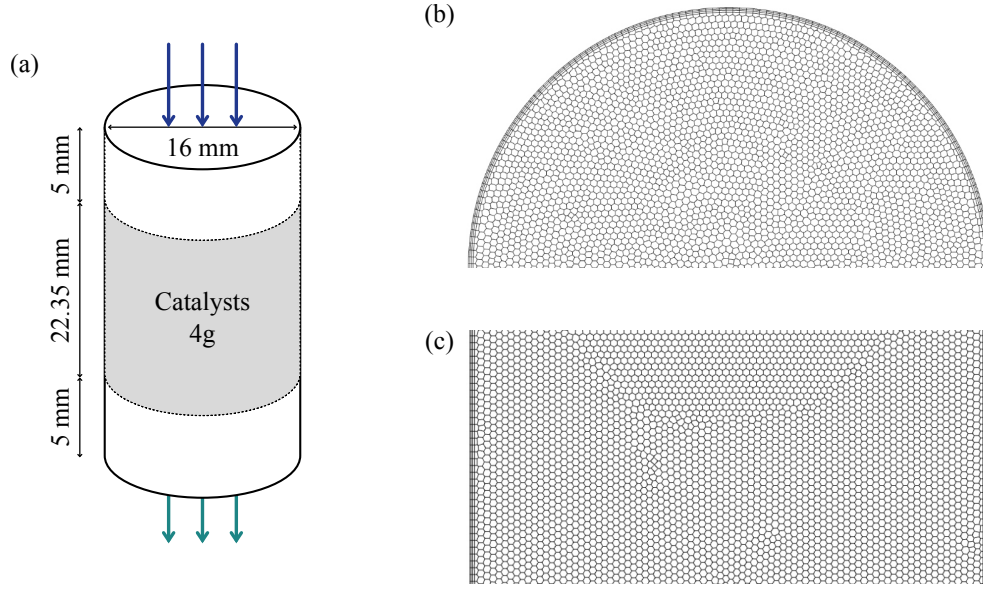


Figure 2.1: Computational domain and mesh of the micro fixed-bed reactor

## 2.4 Results and discussion

### 2.4.1 Validation of the reactive transport model

Table 2.1 shows ... (Liu, 2016; Wang et al., 2014).

Table 2.1: Comparison of numerical results with experimental data

Case	$C_{g,in}^{O_3}$	Packed $\varepsilon_s$	$U_g$	$k_r$	$C_{g,out}^{O_3}$	$C_{g,out}^{O_3}/C_{g,in}^{O_3}$	APE
Unit	ppmv	-	m/s	$s^{-1}$	ppmv	-	%
Exp. 1*	115.1	0.5	0.1124	4.12	50.70	0.44000	-
Num. 1	115.1	0.5	0.1124	4.12	50.84	0.44170	0.39
Exp. 2**	100.0	0.5	0.57	49.12	9.054	0.09054	-
Num. 2	100.0	0.5	0.57	49.12	9.049	0.09049	0.06

\* Data from the work of Liu (2016).

\*\* Data from the work of Wang et al. (2014).

## **2.5 Conclusions**

The present study involved

## References

- Liu, J. (2016). *Reactor performances and hydrodynamics of various gas-solids fluidized beds* [Doctoral dissertation, The University of Western Ontario]. <https://ir.lib.uwo.ca/etd/3967/>
- Wang, C., Wang, G., Li, C., Barghi, S., & Zhu, J. (2014). Catalytic ozone decomposition in a high density circulating fluidized bed riser. *Industrial & Engineering Chemistry Research*, 53(16), 6613–6623.

## Chapter 3

### Conclusions and Recommendations

#### 3.1 Thesis summary and conclusions

This thesis work comprehensively investigates ...

Figure 3.1 depicts ...

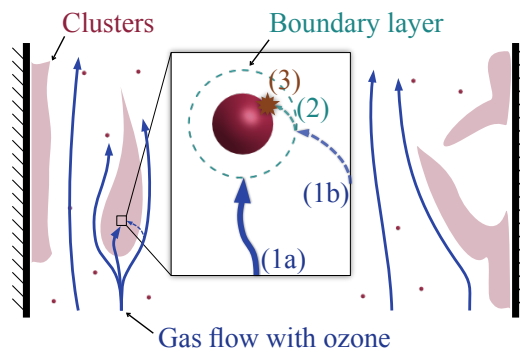


Figure 3.1: Caption...

#### 3.2 Limitations and recommendations

Limitations ...



# **Appendix A**

## **Your appendix**

This is your appendix (Deng et al., 2017).

## References

- Deng, Z., Xia, Y., Long, B., & Ding, Y. (2017). Volumetric properties of diisopropyl ether with acetone at temperatures from 283.15 K to 323.15 K: An experimental and theoretical study. *Journal of Molecular Liquids*, 243, 257–264.

# Curriculum Vitae

**Name:**                   firstname lastname

**Post-Secondary Education and Degrees:**   Department of Chemical & Biochemical Engineering  
The University of Western Ontario  
London, Ontario, Canada  
2018 - present   Ph. D. candidate

School of XXX  
XXX  
Wuhan, Hubei, China  
2012 - 2016   B. Eng.

**Honours and Awards:**   XXXX, 2016  
XXXXXX

National Scholarship, 2015  
Ministry of Education of the People's Republic of China

**Related Experience:**   Research and Teaching Assistant, 2019 - 2023  
The University of Western Ontario, London, Ontario

Visiting Student, 2021  
Shanghai Jiao Tong University, Shanghai, China

## Publications:

Deng, Z., Xia, Y., Long, B., & Ding, Y. (2017). Volumetric properties of diisopropyl ether with acetone at temperatures from 283.15 K to 323.15 K: An experimental and theoretical study. *Journal of Molecular Liquids*, 243, 257–264.