

Kurdistan Region  
Salahaddin University-Erbil  
College of Engineering  
Chemical-Petrochemical Engineering Department



# Oxidation Desulfurization of Naphtha

A Project Submitted to the Chemical-Petrochemical Engineering Department

University of Salahaddin-Erbil

in the Partial Fulfillment of the Requirement for the Degree of Bachelor of Science

in Chemical-Petrochemical Engineering

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## List of Contents

### Contents

Acknowledgement.....	<b>Error! Bookmark not defined.</b>
Abstract .....	<b>Error! Bookmark not defined.</b>
List of Contents .....	ii
List of Tables.....	iv
List of Figures .....	iv
Chapter 1 .....	5
Introduction .....	5
Chapter one: 1 Introduction .....	2
1.2 physical and chemical properties of naphtha.....	<b>Error! Bookmark not defined.</b>
1.3 Methods for desulfurization of naphtha .....	<b>Error! Bookmark not defined.</b>
1.4 Oxidative desulfurization of the naphtha (ODS).....	<b>Error! Bookmark not defined.</b>
➤ Catalyst used in ODS .....	<b>Error! Bookmark not defined.</b>
➤ Oxidants .....	<b>Error! Bookmark not defined.</b>
➤ Extraction .....	<b>Error! Bookmark not defined.</b>
Chapter 2 .....	<b>Error! Bookmark not defined.</b>
Material and methods .....	<b>Error! Bookmark not defined.</b>
Chapter 2: Material and methods .....	<b>Error! Bookmark not defined.</b>
2.1 materials .....	<b>Error! Bookmark not defined.</b>
2.2. Instrument.....	<b>Error! Bookmark not defined.</b>
2.3. The analysis method.....	<b>Error! Bookmark not defined.</b>
2.4. material preparation .....	<b>Error! Bookmark not defined.</b>
2.5 experiment method.....	<b>Error! Bookmark not defined.</b>

2.6The mechanism of UAOD process .....	<b>Error! Bookmark not defined.</b>
Chapter 3 .....	<b>Error! Bookmark not defined.</b>
Result and discussion .....	<b>Error! Bookmark not defined.</b>
Chapter 3: result and discussion.....	<b>Error! Bookmark not defined.</b>
Conversion .....	<b>Error! Bookmark not defined.</b>
Ultrasonic Power Effect .....	<b>Error! Bookmark not defined.</b>
Sodium Chlorite Effect .....	<b>Error! Bookmark not defined.</b>
Mole ratio Citric acid to sodium chlorite effect	<b>Error! Bookmark not defined.</b>
Chapter 4 .....	<b>Error! Bookmark not defined.</b>
Equipment design.....	<b>Error! Bookmark not defined.</b>
4.1 design of the commercial Ultrasonic .....	<b>Error! Bookmark not defined.</b>
Chapter 5 .....	<b>Error! Bookmark not defined.</b>
Economy.....	<b>Error! Bookmark not defined.</b>
Chapter 5: Economy.....	<b>Error! Bookmark not defined.</b>
5.1 importance of economy in process.....	<b>Error! Bookmark not defined.</b>
5.2 Cost of Equipment.....	<b>Error! Bookmark not defined.</b>
5.3 Raw Material Cost and Product Price .....	<b>Error! Bookmark not defined.</b>
Chapter 6 .....	<b>Error! Bookmark not defined.</b>
Safety.....	<b>Error! Bookmark not defined.</b>
Chapter 6: Safety.....	<b>Error! Bookmark not defined.</b>
6.1 Overview of Health Hazards and Risk Factors Associated with Project .....	<b>Error! Bookmark not defined.</b>
6.2 Health hazard information according to MSDS	<b>Error! Bookmark not defined.</b>
<b>defined.</b>	
6.3 first-Aid .....	<b>Error! Bookmark not defined.</b>
6.4 Medical.....	<b>Error! Bookmark not defined.</b>
6.5 Work place controls and practices .....	<b>Error! Bookmark not defined.</b>

6.6 Personal protective equipment (PPE) .....**Error! Bookmark not defined.**  
6.7 NFPA hazard classifications .....**Error! Bookmark not defined.**  
References ..... 3

### List of Tables

**Table 1.1** properties of naphtha ..... **Error! Bookmark not defined.**  
**Table 2.** factors..... **Error! Bookmark not defined.**  
**Table 3** tests and reduced sulfur ..... **Error! Bookmark not defined.**  
**Table 4** Response Table for Signal to Noise Ratios .....**Error! Bookmark not defined.**  
**Table 5** the advantages of ODS over HDS (VMETs UAOD technology)  
..... **Error! Bookmark not defined.**  
**Table 6** capacity of UIP 1600 commercial ultrasonic brand Hielscher....**Error! Bookmark not defined.**

### List of Figures

**Figure 1** General oxidation process of naphtha (oxidation/extraction) ...**Error! Bookmark not defined.**  
**Figure 2.1** the experiment procedure..... **Error! Bookmark not defined.**  
**Figure 3** main plot for SN ratios..... **Error! Bookmark not defined.**

**Figure 4** Personal protection equipment (PPE).....**Error! Bookmark not defined.**

**Figure 6** NFPA hazard classifications .....**Error! Bookmark not defined.**

# **Chapter 1**

# **Introduction**

## **Chapter one: 1 Introduction**

Naphtha is a key intermediate product in the refining industry, obtained from the distillation of crude oil. It is a versatile hydrocarbon mixture consisting of various carbon chain lengths, typically ranging from C<sub>5</sub> to C<sub>12</sub>. Naphtha serves as a vital feedstock for numerous downstream processes, including petrochemical production and gasoline blending.

Naphtha often contains sulfur compounds such as mercaptans, sulfides, disulfides, thiophene (Th), benzothiophene (BT), dibenzothiophene (DBT), 4,6-dimethyl dibenzothiophene (4,6 DMDBT), benzonaphthothiophene (BNT), and so on. (Marsh, Hill et al. 2000)

These sulfur compounds can have detrimental effects on both the downstream processes and the environment. For instance, during the combustion of sulfur-containing fuels, sulfur compounds oxidize to form sulfur dioxide (SO<sub>2</sub>), a major contributor to air pollution and acid rain, respiratory diseases, cancer. Additionally, Sulfur compounds can act as catalyst poisons, particularly in

refining processes. They can deactivate or reduce the effectiveness of catalysts used in hydro-processing units, such as those for hydrocracking and hydrotreating processes, leading to reduced process efficiency and increased maintenance cost.

Hydrodesulfurization (**HDS**), have been widely used in refineries to reduce sulfur content. However, these methods have limitations in terms of their efficiency, cost, and environmental impact. Oxidative desulfurization (**ODS**) has emerged as a promising alternative technique to overcome these limitations. (Almaliky and Alkazrajy 2023).

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