

**SYNTHESIS OF GOLD NANOPARTICLES ON CERIUM OXIDE
(Au-CeO₂) CATALYST FOR REDUCTION OF *p*-NITROPHENOL**

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TABLE OF CONTENT

	PAGE
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF PLATES	viii
LIST OF ABBREVIATIONS	ix
ABSTRACT	x
ABSTRAK	xi
 CHAPTER 1: INTRODUCTION	
1.1 Background Study	1
1.2 Problem Statement	3
1.3 Significance of Study	3
1.4 Objectives	4
1.5 Scope and Limitation of Study	4
 CHAPTER 2: LITERATURE REVIEW	
2.1 Cerium Oxide, CeO ₂	6
2.2 Preparation Method of CeO ₂	7
2.2.1 Chemical Precipitation	7
2.2.2 Sol-Gel Method	9
2.3 Preparation of Au-CeO ₂	9
2.4 Structural Study of Au-CeO ₂	11
2.4.1 XRD	11
2.4.2 FTIR Spectroscopy	12
2.4.3 ICP-OES	13
2.5 Catalytic Study for <i>p</i> -Nitrophenol Reduction	14
 CHAPTER 3: METHODOLOGY	
3.1 Materials	17
3.2 Preparation Method of CeO ₂	17
3.2.1 Chemical Precipitation	17
3.2.2 Sol-Gel Method	18
3.3 Preparation of Au-CeO ₂ by Deposition-Precipitation Method	19
3.4 Catalytic Reduction of <i>p</i> -Nitrophenol	19
3.5 Characterization	19
3.5.1 XRD	20
3.5.2 FTIR Spectroscopy	20
3.5.3 ICP-OES	20

ABSTRACT

SYNTHESIS OF GOLD NANOPARTICLES ON CERIUM OXIDE (Au-CeO₂) CATALYST FOR REDUCTION OF *p*-NITROPHENOL

This study investigates the synthesis of gold (Au) nanoparticles supported on cerium oxide (Au-CeO₂) catalysts and their catalytic activity in the reduction of *p*-nitrophenol (*p*-NP) to *p*-aminophenol (*p*-AP). Cerium oxide was synthesized using two methods, chemical precipitation and sol-gel, and subsequently used as a support for gold nanoparticles via deposition-precipitation. Characterization techniques such as X-ray diffraction (XRD), Fourier Transform Infrared (FTIR), and Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) confirmed the crystalline structure, gold nanoparticle distribution, and chemical composition of the Au-CeO₂ catalysts. The catalytic performance was evaluated through the reduction of *p*-NP using sodium borohydride (NaBH₄) at room temperature. The superior performance of the CP-derived catalyst is attributed to its smaller particle size and more uniform distribution of gold nanoparticles which enhance catalytic activity. The result significantly higher conversion rate of 59.03% compared to only 2.85% for the sol-gel synthesized catalyst. This difference in catalytic activity is attributed to the particle size, distribution of gold nanoparticles, and the presence of oxygen vacancies in the cerium oxide support. The findings highlight the potential of Au-CeO₂ catalysts in environmental applications, particularly in the remediation of hazardous pollutants.