

**CHARACTERIZATION OF NICKEL ZINC OXIDE ANODE
MATERIALS SYNTHESIZED BY A HYDROTHERMAL METHOD**

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TABLE OF CONTENTS

ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLE	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
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 of Study	3
CHAPTER 2 LITERATURE REVIEW	
2.1 History of battery	5
2.2 Lithium-ion battery	6
2.2.1 Sodium-ion battery	7
2.3 Anode materials	9
2.4 Hydrothermal	10
CHAPTER 3 METHODOLOGY	
3.1 Materials	13
3.1.1 Chemicals	13
3.1.2 Apparatus	13
3.1.3 Instruments	13
3.2 Methods	14
3.2.1 Synthesizing NiZn ₂ O ₄ anode material though hydrothermal method	14
3.2.2 Characterization of NiZn ₂ O ₄ anode material	15
3.2.2.1 Scanning electron microscopy-energy dispersive spectroscopy	15
3.2.2.2 X-ray diffractometry (XRD)	15
3.2.2.3 Thermogravimetric analysis (TGA)	16
3.2.2.4 Attenuated total reflection-fourier transform infra-red (ATR-FTIR)	17
CHAPTER 4 RESULT AND DISCUSSION	
4.1 Characterization	18

4.1.1	Scanning electron microscopy-energy dispersive spectroscopy (SEM-EDS)	18
4.1.1.1	Energy dispersive spectroscopy (EDS)	20
4.1.2	X-ray diffractometry (XRD)	22
4.1.3	Thermogravimetric analysis (TGA)	23
4.1.4	Attenuated total reflection-fourier transform infra-red (ATR-FTIR)	24
CHAPTER 5 CONCLUSION AND RECOMMENDATION		26
CITED REFERENCE		28
APPENDICES		31
CURRICULUM VITAE		32

LIST OF TABLE

Table	Caption	Page
4.1	EDS result of powdered NiZn ₂ O ₄ anode material	22
4.2	ATR-FTIR result of powdered NiZn ₂ O ₄ anode material	24

ABSTRACT

CHARACTERIZATION OF NICKEL ZINC OXIDE ANODE MATERIALS SYNTHESIZED BY A HYDROTHERMAL METHOD

NiZn₂O₄ samples anode materials were prepared by hydrothermal reaction and its physical characterization was being analysed by using scanning electron microscopy-energy dispersive spectroscopy (SEM-EDS), X-ray diffractometry (XRD), thermogravimetric analysis (TGA) and attenuated total reflection-fourier transform infra-red (ATR-FTIR). The synthesized anode materials morphology was observed by SEM-EDS and the result show the rough surface of sample and irregular shape of sample as well as the composition of element oxygen, sulphur, nickel and zinc as the major elements in NiZn₂O₄. Sharp diffraction peaks obtained in XRD indicate good crystallinity of the sample. The TGA shows the starting loss was discovered as water that contains in the sample turn the percentage decrease. Also, the endothermic and exothermic effect was determined at the second phase and late phase of TGA. The FTIR spectra of NiZn₂O₄ samples are in the range 1712.97 cm⁻¹ to 535.42 cm⁻¹. The $\nu(\text{C-O})$ of ligand is observed at 1260.05 cm⁻¹. The strong band with a shoulder noticed at 1712.97 cm⁻¹ can be attributed to $\nu(\text{C=O})$ of the lactone carbonyl group. In this study, the hydrothermal conditions such as alkaline concentration, reaction temperature and duration time have an important influence on the product structure and the performance of the electrode prepared with sample.