

**SYNTHESIS AND CHARACTERIZATION OF CALCIUM COPPER
OXIDE AS ANODE MATERIAL FOR SODIUM BATTERIES USING
SOL GEL METHOD**

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TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLE	vi
LIST OF FIGURE	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	x
ABSTRAK	xi
CHAPTER 1 INTRODUCTION	
1.1 Background of the study	12
1.2 Problem statement	14
1.3 Significant of study	14
1.4 Objectives	15
CHAPTER 2 LITERATURE REVIEW	
2.1 Anode Battery	16
2.1.1 Lithium Ion Battery	16
2.1.2 Sodium Ion Battery	17
2.2 Method involved in synthesizing of the anode materials	18
2.2.1 Hydrothermal	18
2.2.2 Solid state	19
2.2.3 Sol gel method	20
CHAPTER 3 METHODOLOGY	
3.1 Chemicals	22
3.2 Apparatus	22
3.3 Instruments	22
3.4 Methods	23
3.4.1 Synthesizing of CaCuO _x as anode material through sol gel method	23
3.5 Characterization of CaCuO _x as anode material	24
3.5.1 X-ray diffraction (XRD)	24
3.5.2 Thermogravimetric analysis (TGA)	24
3.5.3 Scanning Electron Microscope with Energy Dispersive Spectroscopy (SEM/EDS)	25
3.5.4 Attenuated Total Reflectance-Fourier Transform Infrared Spectroscopy (ATR-FTIR)	26

CHAPTER 4 RESULTS AND DISCUSSION	
4.1 Characterization	28
4.1.1 Thermogravimetric Analysis (TGA)	28
4.1.2 Attenuated Total Reflectance-Fourier Transform Infrared Spectroscopy (ATR-FTIR)	30
4.1.3 Scanning Electron Microscopy with Energy Dispersive Spectroscopy (SEM/EDS).	32
4.1.4 X-ray Diffraction (XRD)	37
CHAPTER 5 CONCLUSION AND RECOMMENDATIONS	39
CITED REFERENCE	42
APPENDICES	46
CURRICULUM VITAE	47

LIST OF TABLE

Table	Caption	Page
4.1	FTIR result of powdered calcium copper oxide anode material	28
4.2	EDS result	34

ABSTRACT

SYNTHESIS AND CHARACTERIZATION OF CALCIUM COPPER OXIDE AS ANODE MATERIAL FOR SODIUM BATTERIES USING SOL-GEL METHOD.

Calcium copper oxide (CaCuO_x) anode material in a sodium-ion battery was synthesized by polyvinyl alcohol (PVA) assisted sol gel-method and its physical characterization was being analysed by using Thermogravimetric Analysis (TGA), Attenuated Total Reflectance-Fourier Transform Infrared Spectroscopy (ATR-FTIR), X-ray Diffraction (XRD), Scanning Electron Microscopy with Energy Dispersive Spectroscopy (SEM/EDS). After the TGA analysis, the calcination temperature for the anode material was determined and 800°C was set up at the furnace. The temperature was chosen as the calcination temperature because the TGA curve becomes flat and no mass loss occurs at temperature above 700°C indicating the completion of the entire reaction. In the ATR-FTIR analysis, the peaks that appear at 458.45 cm^{-1} , 538.88 cm^{-1} and 547.11 cm^{-1} is similar to the copper oxygen (Cu-O) bond. After that, the peak that appears is 876.36 cm^{-1} and related to carbonate ions which is (O-C-O) bond. Last peak appeared in the spectrum is at 1417.58 cm^{-1} considered as C-O-H bonding. From the SEM/EDS analysis, the morphology of synthesized CaCuO_x anode material show uniform and compact surfaces, with no existence of holes or cracks. Agglomerated particles also can be observed. For the XRD analysis, it indicate the synthesized material have high degree of crystallinity. For the elemental composition CaCuO_x displays the existence of Ca, Cu, O and C as the major elements in the sample. In this study, the confirmation about electrochemical ability of synthesized CaCuO_x anode material cannot be made because no electrochemical characterization was being performed.