DEVELOPMENT AND PERFORMANCE OF PEROVSKITES AS A CATHODE WITH APPLICATION TOWARDS GAS CLEANING

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Thesis submitted in fulfilment
of the requirements for the degree of
Bachelor of Engineering (Hons) Chemical

Faculty of Chemical Engineering

January 2019

ACKNOWLEDGEMENT

I would like to express my gratitude to Allah S.W.T for His willingness and consent which contributes to the success of my research project with title of Development and performance of perovskites as a cathode with application towards gas cleaning. Without His guidance and mercy, I may be not able to finish my project successfully.

First and foremost, I want to send my gratitude and special thanks to my supervisor, Encik Ammar Bin Mohd Akhir for his great guidance and have been a very good supervisor to me, with giving so much advice and encouragement to finish this project.

Last but not least is special thanks to my family members who always give me support, advice, encouragement and pray for my well-being. I cannot express my gratitude towards my family with words as they always sacrifice their time to be with me all the time. For my friends, I appreciate your help and kindness whenever I asked for guidance and always support each other to finish our study.

ABSTRACT

The solid oxide fuel cell (SOFCs) is a new alternative energy and environmentally friendly. There are three major elements in SOFC which are anode, cathode and electrolyte. As perovskite is one of the major materials in SOFC where used as a cathode. However, the development of high-quality performance SOFC might be facing a difficulty because of its development quite costly. This study is to determine the electrical conductivity of cathode achieved and to fabricate SOFC cathode using combination of polyvinyl alcohol as a binder and starch. During this study, three different weight percentage of starch is used to determine the electrical conductivity. The result showed all the samples are classified as crystallite thus can use Scherrer equation to calculated the average crystallite size. The average crystallite sizes are decreasing as the starch weight percentage increase. For conductivity test, there is unavoidable error during the test. The conductivity of LSCF pellet should be increase as the weight percentage of starch increase. The result showed fluctuation resulting from the catalytic activity for oxygen reduction of LSCF cathode reaction. Thus, the objectives of this study not fully achieved due the unavoidable error lead to fluctuation result.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

The renewable energy nowadays keeps on changing and people trying to develop more efficient energy to produce fewer damaging substances. One of the rising energy producing is solid oxide fuel cells (SOFCs) as its capability of produce electricity in environmental friendly way (Fan, Keane, Singh, & Han, 2014). SOFCs can be defined as a promising alternative energy to new environmental-friendly energy which consisted of cathode, anode and electrolyte. In this study, the focus only on the cathode fabrication. The selection of materials for cathode also important matter to fabricate the high quality SOFCs and the chosen cathode material in this study is lanthanum strontium cobalt ferrite (LSCF) because of some advantages. The cathodes in pellets shape during this fabrication process.