

The Research of Automatic Switch Control System between Kinetic and Electric Energy – The Application for Electric Power

林建雄、林螢光 鐘翼能

E-mail: 9419789@mail.dyu.edu.tw

ABSTRACT

This study transformed the kinetic energy in moving vehicle to electric power for battery charging, based on the concepts of Pure Electric Vehicle (PEV) and Hybrid Electric Vehicle (HEV). It aims to improve the obstructing factors in the development of electric vehicles, such as insufficient charging device and time-consuming charging, which limit the efficiency of electric vehicles and result in inconvenience, and in order to improve the functions of electric vehicles and increase the market share, in turn to decrease the environmental pollution caused by gasoline vehicles and consumption of petroleum resources. The experiment used 8052 single chip to control the dual battery set to detect the voltage conditions automatically, and electric system composed of switch-controlled circuit and generating set on moving vehicles to conduct auto-detection of battery voltage and control the electric discharge of the dual battery set and instant charging conditions. It used simple design electric vehicle for the system integration experiment. In idle test, the results of two cycles of charge and discharge showed that the single battery usage time increased from 120 minutes to over 500 minutes. The road test, the results of charge and discharge cycle showed that the single battery usage time increased from 50 minutes to over 200 minutes. The efficiency evaluation and consumption analysis were discussed in the paper.

Keywords : Pure Electric Vehicle PEV ,Hybrid Electric Vehicle (HEV)

Table of Contents

封面內頁 簽名頁 授權書.....	iii	中文摘要.....	v	英文摘要.....	v
摘要.....	vi	誌謝.....	vii	目錄.....	viii
目錄.....	xiv	第一章 緒論 1.1 前言.....	1	1.2 電動車發展.....	2
類.....	2	1.2.1 電動車沿革.....	2	1.2.2 電動車種類.....	3
構.....	6	1.2.3 PEV、HEV優缺點評估.....	4	1.2.4 混合動力系統架構.....	6
估-鉛蓄電池應用.....	10	1.3 研究動機與目的.....	9	第二章 相關技術探討 2.1 電池評估因素.....	11
估因素.....	11	2.1.1 電池發展.....	10	2.1.2 電動車電池主要評估因素.....	11
池.....	16	2.1.3 鉛蓄電池.....	13	2.1.4 電動車用蓄電池.....	16
介.....	17	2.2 交流發電機.....	17	2.2.1 簡介.....	17
式.....	20	2.2.2 發電機發電原理.....	18	2.2.3 交流發電機整流方式.....	20
用.....	21	2.3 電動車充電方式應用.....	21	2.3.1 太陽能發電之應用.....	21
系統.....	26	2.3.2 風力發電之應用.....	24	2.3.3 再生制動裝置-煞車回收系統.....	26
實驗用之設備及儀器.....	28	第三章 整合系統研究與實驗 3.1 充放電控制系統之基本架構.....	27	3.2 實驗用之設備及儀器.....	28
交流發電機.....	29	3.2.1 簡易型電動機車.....	28	3.2.2 實驗用之交流發電機.....	29
析.....	33	3.2.3 實驗測試用儀器.....	30	3.3 實驗效能分析.....	33
測試.....	39	3.3.1 實驗一:系統模型分析.....	33	3.3.2 實驗二:原始架構空載測試.....	39
換充放電系統之規劃.....	46	3.3.3 實驗三:增加備用電池組之規劃.....	43	3.3.4 實驗四:電動機車自動切換充放電系統之規劃.....	46
實驗結論.....	61	3.3.5 實驗五:實際路測紀錄.....	59	第四章 結論與未來展望 4.1 實驗結論.....	61
望.....	65	4.2 規劃系統之應用.....	62	4.2.1 應用於四輪之電動車上之規劃.....	62
料.....	67	4.2.2 系統應用於大型電動機車之規劃.....	62	4.3 未來展望.....	65
		參考文獻資料.....	66	附錄 補充資料.....	67

REFERENCES

[1] 李添財(民93), 電動汽機車, 全華圖書, 台北 [2] 陳振興副教授, 電動機車電池評估, 義守大學化學工程系
<http://www.isu.edu.tw/98spring/work/secretary/paper/pl.htm> [3] 林振江、施保重(民91), 混合動力車之理論與實際, 1-2-2-71, 全華圖書

, 台北 [4] William H.Crouse、Donald L.Anglin, 劉崇富編譯(民86), 汽車學(三), 第三冊, 頁42-55, 麥格羅.希爾書局, 高立圖書代理, 台北 [5] 孫清華(民89), 最新可充電電池技術大全, 頁2-1-6-48, 全華圖書, 台北 [6] 吳金成、沈慶陽、郭庭吉(民82), 8051單晶片微電腦實習與應用, 頁9-1—11-54, 松崗電腦圖書, 台北 [7] 電動機車用具有能量回送特性之單級不對稱半橋式快速充電器, 義守大學 潘屏榮, 指導教授 邱煌仁 任善隆 [8] 鉛酸電池脈衝充電特性研究, 中山大學 鄭戎傑, 指導教授 莫清賢