A Novel State of Charge Estimation Method for Ternary Lithium Batteries Based on System Function and Extended Kalman Filter

Xiong Xin, Shun-Li Wang*, Chun-Mei Yu, Jiang Cong, James Coffie-Ken

School of Information Engineering, Southwest University of Science and Technology, Mianyang 621010, China;

*E-mail: 497420789@qq.com

doi: 10.20964/2020.03.47

Received: 15 October 2019 / Accepted: 14 January 2020 / Published: 10 February 2020

The Equivalent Thevenin model is established to describe the external performance of ternary lithium ion battery based on Hybrid Pulse Power Characteristic experiment by identifying and verifying model parameters. The state of charge estimation model is built in SIMULINK using Extended Kalman Filter algorithm and system function of MATLAB. The Simulation results under the working conditions of the experimental data shows that, the maximum error of the Thevenin model is 0.08V and its average error is 0.04V. Based on the Thevenin model, the state of charge estimation result shows a better performance in accuracy and robustness compared with traditional coulomb counting method. The maximum error is less than 0.01 and the average error is 0.008 which shows the systematic process and the correctness of the estimation method in this paper.

Keywords: Ternary lithium battery; State of charge; Extended Kalman Filter; System function

[FULL TEXT](#)

© 2020 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).