

Active-Material Variation Analysis of a Lithium-Ion Battery

Authors : Muhammad Husnat Khalid, Stephan Bihn, Dirk Uwe Sauer, Nisai Fuengwarodsakul

Abstract : To combat the effects of climate change, lithium-ion batteries are getting a lot of attention for energy storage. However, due to its diverse range of applications extending from small electronics equipment to energy storage systems, its output requirements, as well as limitations, vary significantly. Many efforts are underway to increase the power and energy output of the cells without any significant compromise on their size and weight. In this paper, different active materials are explored for an existing cell Kokam that initially has graphite as anode and NCO as cathode material. The Pareto front optimization tool is then utilized to pick a cell that gives the optimum results in terms of energy, power, or both. The parameter variation of the cells is done in the MATLAB application ISEA Cell and Pack Database (ICPD) created by the Institute of Power Electronics and Electrical Drives (ISEA) RWTH Aachen, University that creates the physical-chemical model of the existing cells.

Keywords : battery storage system, lithium-ion battery, active material variation, cell design optimization

Conference Title : ICPE 2022 : International Conference on Power Engineering

Conference Location : Singapore, Singapore

Conference Dates : November 18-19, 2022