Investigation of the thermal condition of the battery in the operating cycle

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A study of thermal processes during charging and discharging of lithium-ion batteries in order to predict its temperature condition was conducted. The amount of heat, which is given away to the surroundings by the element, the temperature level and the electrical characteristics of the element were measured in the working process. Unit of lithium-ion battery with a capacity of 150 A·h was the object of experimental study. Experimental stand allows to supply the element with charge currents in the range of 20…75 A, and with discharge currents of 30...150 A. The amount of heat, which was extracted from the unit, was determined by calorimetric method with water heating. The temperature of walls in the unit in case of natural convection was determined by thermographic camera in temperature range of 18...65 °C on different modes. As a result of the study, the withdrawn heat capacity, the total amount of extracted heat, the internal resistance of the unit in the process of charging and discharging at different currents and at different initial temperature processes were obtained.

Keywords: *storage battery, lithium-ion, charge, discharge, heat capacity, calorimetry.*

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