Analysis and Comparison of Generalized Peukert's Equations Parameters for Nickel-Cadmium Batteries with Pocket and Sintered Electrodes

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In this paper, it is proved by experiments that the generalized Peukert's equations $C = C_m / (1 + (i/i_0)^n)$ and $C = C_m \operatorname{erfc}((i/i_k - 1)/n) / \operatorname{erfc}(-1/n)$, are applicable for the released capacity evaluation by nickel-cadmium batteries at any discharge currents and with electrodes of any types (pocket, sintered, plastic bonded). It was shown that in limits of experimental error, the parameter n coincides for batteries of various capacities but with the same type of electrodes and with the same discharge mode. But the parameter n depends on the batteries' discharge mode (medium, high) and electrodes type (pocket, sintered, plastic bonded). The explanation is proposed for the parameters changing of the generalized Peukert's equations for batteries of different discharge modes and having the different types of electrodes. The explanation is based on the statistical interpretation of the generalized Peukert's equations and the electrochemical process distribution along the porous electrode depth.

Keywords: Peukert's equation, modeling, battery, nickel–cadmium, discharge current

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