

Microstructure investigation of positive electrodes of Li-ion batteries by the method of small-angle neutron scattering

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Currently, lithium-ion batteries are the most commonly used chemical sources of current. When considering the evolution of modern electronic devices, there is a clear tendency towards their miniaturization and increased functionality. This leads to a significant increase in energy consumption, which, in turn, requires the creation of more efficient and compact sources (accumulators) of energy.

The work is aimed at conducting systematic studies of qualitative and quantitative patterns between the microstructure of electrode coatings and their specific characteristics. Information on the microstructure at all stages of the synthesis and modification of coatings will be obtained using small-angle neutron scattering, which, thanks to the high penetrating power of this radiation, allows us to study industrial systems within nondestructive testing.

Summary

The main goal of the work is to develop common practical criteria for optimizing the microstructure of the electrodes based on a wide range of active materials, nanostructured carbon additives and modified polymeric binders, which make it possible to achieve a significant gain in specific energy and power of lithium-ion batteries. Developed in the course of the project, scientific and technological solutions for the formation of electrode coatings with a given microstructure can form the basis for prototyping and creating domestic electrochemical energy storage devices with enhanced specific characteristics

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