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Correlation between morphology and electrochemical performance of the single-phase layered P2-Na0.7MnO2 cathode material for sodium-ion batteries

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The study of materials for sodium-ion batteries is currently a very promising direction due to the fact that sodium-ion batteries are considered as a real alternative to lithium batteries. Sodium layered transition metal oxides are an important family of cathode materials. Using them, we can potentially reduce the cost of the battery, and at the same time increase the energy density, cyclability and operational safety. [1]
In this work, the object of study is the cathode material - a single-phase layered oxide based on manganese - P2-Na0.7MnO2. In our work, we use planetary milling to study how such processing affects both the morphology of the particles and subsequently the electrochemistry of the material. Theoretically, current values can be increased by reducing the particle size of the material. [2] Moreover, mechanical milling can also be used to solve the problem of slow Na+ diffusion kinetics, since decreasing the particle size results in shorter diffusion paths and an increase in the active surface area of the material in contact with the conductive additives as well as the electrolyte. [3, 4]
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Primary authors: DONETS, Marina; Dr SAMOYLOVA, Nataliya (JINR FLNP)

Co-authors: Dr KORNEEVA, Ekaterina (JINR FLNR); Dr VASIN, Roman (JINR FLNP); Mr SUMNIKOV, Sergey (JINR FLNP)

Presenter: DONETS, Marina

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