Neutron Scattering Study on Cathode LiMn2O4 and Solid Electrolyte 5(Li2O) (P2O5)

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Neutron scattering study on cathode $\mathrm{LiMn_2}\,O_4$ and solid electrolyte $5(\mathrm{Li_2}\,O)(P_2O_5)$

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Abstract

Neutron scattering is very important technique in order to investigate the energy storage materials such as lithium-ion battery. The unique advantages, neutron can see the light atoms such as Hydrogen, Lithium, and Oxygen, where those elements are negligible by other corresponding X-ray method. On the other hand, the energy storage materials, such as lithium ion battery is very important for the application in the electric vehicles, electronic devices or home appliances. The battery contains electrodes (anode and cathode), and the electrolyte materials. There are many challenging to improve the existing lithium ion battery materials, in order to increase their life time, cyclic ability and also its stability. One of the most scientific challenging is to investigate the crystal structure of both electrode and electrolyte, such as cathodes $\mathrm{LiCoO_2}$, $\mathrm{LiMn_2}\,O_4$ and $\mathrm{LiFePO_4}$, and solid electrolyte $\mathrm{Li_3\,PO_4}$. Since all those battery materials contain Lithium ions and Oxygen, the used of neutron scattering techniques to study their structure and related properties are very important and indispensable. This article will review some works of investigating electrodes and electrolytes, $\mathrm{LiMn_2}\,O_4$ and $5(\mathrm{Li_2}\,O)(P_2O_5)$, by using a high resolution powder diffraction (HRPD) at the multipurpose research reactor, RSG-Sywabessy of the National Nuclear Energy Agency (BATAN), Indonesia.

Key Topics

Electrolytes
Cathodes
Lithium ion batteries
Neutron scattering
Crystal structure