

EMERGING BATTERY RESEARCH IN INDONESIA: THE ROLE OF NUCLEAR APPLICATION

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Abstract

Indonesia with the fourth largest populations in the world has increased its consumption of energy for the transportation, industry, household, etc. The energy that is used is mostly fossil fuels which will be a burden in the near future, due to limited sources, environmental damage and increasing CO₂ emission. On the other hand, a new life style that is widespread among all generations, such as using portable electronic devices or gadgets, also increases the energy consumption. Given this situation, the innovative technology related to the renewable energy sources that support green energy and green economy will be indispensable. The research and development of a new generation of batteries, such as lithium ion batteries, will play important role in the move towards innovative sustainable energy. In order to reduce the lithium battery production cost, the government has come up with the strategy to use local resources. Thus the battery technology based on local resources becomes a major concern of national research interest in Indonesia, since there are abundant local resources here. In order to expedite the program, the government has facilitated the construction of new battery laboratories at several research agencies and universities. A national consortium of lithium ion battery which consists of several institutions, universities and industry was started in 2013. In the private sectors, the production of new national electric vehicles (MOLINA) has been started. To this end, the global market of compact size and large-scale rechargeable batteries, with up to 400Wh/kg capacity will generate an enormous market. Therefore, this technology becomes part of the National Industrial Strategic Plan.

For the realization of the of rechargeable lithium ion batteries, with highly targeted values, a comprehensive research and technology on processing the battery components such as electrolyte, electrodes, separator, current collectors and even the electrolyte/electrode interfaces of rechargeable battery are very crucial and indispensable. The importance of understanding on how lithium ions work during charge and discharge, in the structure of electrode and electrolyte is unavoidable. In order to elucidate the basic science of the battery processing within the spatial and time correlations, the application of nuclear technology is very important. The unique properties of neutrons to detect the light elements such as, Lithium ion, is indispensable. The utilization of neutron scattering facilities at National Nuclear Energy Agency (BATAN) in Indonesia will provide significant contributions. It is believed that the growing battery research communities in Indonesia will turn into potential users of neutron scattering techniques. Furthermore, the international networking with worldwide neutron facilities like J-PARC in Japan will bring mutual benefits.

記入例

物質構造科学 Materials Structure Science

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