R & D strategy and its related activities on advanced Li-ion batteries for electrical energy storage system

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Abstract

Fossil fuel, in particular, coal has been the dominant source of electricity generation in the world. Abundant coal reserves may maintain current consumption levels longer than oil and gas as prospect. However, every kWh of electricity generated by burning coal coproduces an average 1000 g lifecycle CO_2 emission, a greenhouse gas that is widely considered as the primary contributor to global warming.[1,2] The environmental concerns over the use of fossil fuels and their resource constraints, combined with energy security concerns, have spurred great interest in generating electric energy from renewable sources. Unfortunately, Most of renewable resources including solar and wind are well known to be not constant and reliable sources of power. The variable nature of these renewable sources causes significant challenges for the electric grid operators because other power plants (usually fossil fueled power plants) need to compensate for the variability. To smooth out the intermittency of renewable energy production, low-cost electrical energy storage (EES) systems have been emerged as a proper alternative. Eventually, EES has been considered as a key enabler of the smart grid or future grid, which is expected to integrate a significant amount of renewable energy resources while providing fuel (i.e., electricity) to hybrid and electrical vehicles, although the cost of implementing EES is of great concern.[3,4] At the moment, the most promising Li-ion batteries among candidate EES technologies have not yet been fully demonstrated to meet the performance and economic matrix for the utility sector.

In this work, we will introduce the R&D status in KERI on developing advanced Li-ion batteries for ESS application with respect of cost and energy density, and then discuss whether these batteries can meet the performance and economic matrix for stationary applications.

References

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