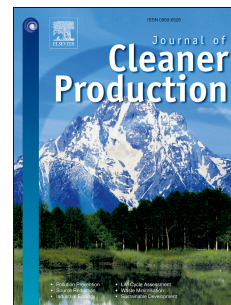


Accepted Manuscript

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PII: S0959-6526(17)32190-X

DOI: [10.1016/j.jclepro.2017.09.189](https://doi.org/10.1016/j.jclepro.2017.09.189)

Reference: JCLP 10694

To appear in: *Journal of Cleaner Production*

Received Date: 25 May 2017

Revised Date: 19 September 2017

Accepted Date: 19 September 2017

Please cite this article as: Gong Y, Yu Y, Huang K, Hu J, Li C, Evaluation of lithium-ion batteries through the simultaneous consideration of environmental, economic and electrochemical performance indicators, *Journal of Cleaner Production* (2017), doi: 10.1016/j.jclepro.2017.09.189.

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Evaluation of Lithium-ion Batteries through the Simultaneous Consideration of Environmental, Economic and Electrochemical Performance Indicators

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Abstract When Lithium-ion Batteries (LIBs) are claimed to be ‘green’, they should not only exhibit outstanding electrochemical performances but also have a relatively lower environmental impact and attractive prices and benefits. From this point of view, we establish a comprehensive LIB evaluation system based on a multi-layer index and provide a comprehensive method for evaluating battery performance. The assessment system considers three aspects: environmental impacts, economic parameters, and electrochemical performances, with several indicators for each aspect. We use the footprint family of indexes to characterise the environmental impact of the battery. We analyse the comprehensive performance and evaluate the size of the market competitiveness with quantitative comparisons of the scores for each battery. A comprehensive assessment system with eleven indicators relating to the three aspects is built. As the indicators have different dimensions and units, we use a calculation method called entropy weight to normalise and nondimensionalise the

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