

On using splitter plates and flow guide-vanes for battery module cooling

Kairat Ismailov, Desmond Adair, Yerzhan Massalin, Zhumabay Bakenov

- School of Engineering

Abstract

Thermal management of lithium-ion battery modules needs to be an integral part of the design process to guarantee that temperatures remain within a narrow optimal range. Also it is important to minimize uneven distribution of temperature throughout a battery module so as to enhance the battery life cycle, and, charge and discharge performances. This paper explores by simulation, the benefits of attaching thin surfaces extended into the near-wake of cylindrical lithium-ion cells, here termed integral wake splitters, and, of placing flow guide-vane in the vicinity of the near wake, regarding thermal management. When using the integral splitters it is found that the local Nusselt numbers in the very near wake of a single cylindrical cell are depressed and the temperature distribution within the cell was found to be reasonably constant. Similar results were found when the cells are in formation. Use of guide-vanes also show promise in maintaining constant temperature distributions throughout the module.

Original language	English
Pages (from-to)	1-10
Number of pages	10
Journal	<u>Heat and Mass Transfer/Waerme- und Stoffuebertragung</u>
State	Accepted/In press - Mar 15 2016

Ismailov, K., Adair, D., Massalin, Y., & Bakenov, Z. (2016). *On using splitter plates and flow guide-vanes for battery module cooling. Heat and Mass Transfer/Waerme- und Stoffuebertragung*, 1-10.
DOI: 10.1007/s00231-016-1794-5