Public Abstract
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Title:Validation and Insight Into a Novel Packed-Bed Electrode Flow Battery Architecture

In order to improve upon current flow battery technology and to obtain higher specific energies, a novel packed-bed electrode flow battery (PBEFB) is proposed. The validation of the use of packed-bed electrodes in a flow battery architecture is presented along with insight into how configuration parameters of the PBEFB affect its operation.

Investigations into the effects of electrode separation distance, electrolyte flow, ionically active electrode separation materials, and electrolyte circulation direction were conducted. The results indicate that electrolyte flow is essential for proper operation of the PBEFB. A decrease in performance was attributed with increasing the electrode separation distance, and the use of ionically active separation materials improved PBEFB performance. The use of a basic ion exchange material as the separation material with 5.4-cm of electrode separation outperformed a non-ionically active material at with only 2.2-cm of electrode separation. No significant impact was observed with a change in electrolyte flow direction.

These initial investigations indicate successful methods of operating packed-bed electrodes in a flow battery and provide great promise for the PBEFB in improving upon current flow battery technologies and extending flow battery technology to electric vehicle applications.