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Simulation of Bio-Inspired Porous Battery Separators

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ABSTRACT

Li-Ion rechargeable battery is one of the most-used rechargeable batteries around the industry of the world. The battery is most used in most electronic devices, electrical cars. But the battery separator is one of the mainly problem that limits the service life. If we can find the way to improve the performance of the battery separator, we can highly increase the service life of the Li-Ion battery. The goal of the project 'Simulation of Bio-Inspired Porous Battery Separators' is to generate a tool for users in order to create computer models of bio-inspired porous structures that resemble porous separators layer in lithium-based batteries. The simulated porous structure resembles a tree, with the branches as the porous channels. To generate the tool, a 2D model of a tree must be generated by coding in Python. Then, the 2D model was modified into 3D. Next, the GUI and user-defined parameters were added to the model, such as the branch length of the tree and the angle of the branch. The result of this design is a tool, which can let the users to generate a tree and control the structure of the tree themselves. The model, once generated, will be useful to study the performance of separator with tree-like porous morphologies in lithium-based batteries. In the future research, the tool can be developed into like "generate a forest".

KEYWORDS

Battery, Bio-Inspired Model, Simulation Tool, Python.

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