Efficient Dry-Cell Batteries Powered by Environmental-Friendly and Low Cost Activated Carbon Derived from Bacterial Cellulose

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At present, dry-cell batteries contain carbon electrodes as a major component. The efficiency of carbon electrodes is based on the high surface area and the porosity of the carbon for better electron transportation. Bacterial cellulose that is produced with Gluconocetobacter xylinum fermentation contains nanostructure fibers of ideal characteristics for porous carbon production. It is also economical and easy to produce from simple chemical activation. Furthermore, in the Southern part of Thailand, many wasted materials are potentially suitable for bacterial cellulose production. The contribution of this research is we propose a method for reusing these wastes as low-cost medium for bacterial fermentation. We investigate the efficient way to produce porous activated carbon from bacterial cellulose and observe its characteristics in terms of absorption capacity, microstructure, chemical components, and conductivity. The porous activated carbon is then applied to low-cost, paper-thin, and efficient dry-cell batteries. Their generating potential, longevity, and power density are also measured.

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Third Award of $1,000