

Stainless Steel Catalyst Lowers Cost of Microbial Fuel Cells

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Researchers at Pennsylvania State University have replaced expensive platinum with a stainless steel bristle brush as the catalyst in microbial fuel cells. Image credit: Bruce Logan.

(PhysOrg.com) -- Tiny bacteria munching on and metabolizing biodegradable materials can produce electrons that could be harnessed by microbial fuel cells for energy. By taking advantage of the catalytic reactions of these microorganisms to convert chemical energy to electric energy, microbial fuel cells could be a promising method for generating hydrogen fuel.

One way to improve microbial fuel cells' efficiency is by adding a small jolt of electricity at the cathode, while the bacteria feed at the anode. However, the best cathode material currently known is platinum, an expensive precious metal.

Recently, researchers at Pennsylvania State University led by Bruce Logan have discovered that a stainless steel brush works just as efficiently as platinum, cutting the cost of the cathode by more than 80 percent. As Logan explained, the requirement for platinum had been holding back development of microbial fuel cells, and the stainless steel alternative should enable scientists to push forward with their research.

One key to making stainless steel an effective catalyst was increasing the surface area of the cathode by arranging the stainless steel in the shape of a bristle brush, with densely packed bristles. The researchers predict that they can improve stainless steel's efficiency even further by making modifications such as minimizing the hydrogen bubbles that get trapped between the bristles.

Other challenges still remain in microbial fuel cell research before the technology becomes economical, such as the problem of scaling the device and maintaining its efficiency. Nevertheless, as Patrick Hallenbeck at the University of Montreal told *Technology Review*, researchers have made tremendous progress in microbial fuel cells in the past few years.

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