Insights: Publications

A silver assist for microbial fuel cell power

Science 373 (6561), 1308-1309

SEPTEMBER 17, 2021 Written by

Undegraded carbon sources provide an excellent fuel for bacteria, and the electrons generated by their oxidative respiration can be harvested with electrodes in microbial fuel cells. Many bacterial and material modification strategies have improved overall fuel cell power output, but a more important measure is Coulombic efficiency (CE), the percentage of electrons harvested from the fuel. On page 1336 of this issue, Cao et al. achieve a record-setting microbial fuel cell power density of 6.6 W/m2 with an 81% CE with a common electroactive bacterial species, Shewanella, by exploiting its intrinsic heavy-metal resistance to enhance electron transfer. A modified electrode material of reduced graphene oxide (rGO) and silver (Ag) creates silver ions (Ag+) that migrate into the cellular membrane. Reduction of Ag+ by proteins linked to lactate oxidative metabolism formed Ag nanoparticles (NPs), which created electron pathways that increase current and power density.