

Micro Fuel Cells



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Abstract

The importance of new power sources for portable equipment such as note PCs, PDAs and cellular phones is growing steadily year by year paving the way towards the advent of the ubiquitous society. Presently, lithium-ion batteries (LIBs) are commonly used in these mobile electronics, but they have already approached to almost the limits of their capacity, this would make the development of a higher-capacity power source a matter of great urgency.

Since alcohol solutions are generally used as the fuel in micro fuel cells, they can generate five to ten times as much power per unit weight as the conventional LIBs. Moreover, from the user's perspective, micro fuel cells have advantages in that they offer cheap and easy means to power electronic devices by simple refueling anywhere at anytime, enabling continuous use of mobile devices when there is no an accessible power line. Furthermore, micro fuel cells may reduce environmental impact compared to the conventional fossil fuel energy sources.

Technology

At Fujitsu Laboratories, we have developed materials technologies to realize a low methanol cross-over membrane electrode assembly (MEA) that is indispensable in improving the fuel cell performance. Here, the methanol crossover is controlled by utilizing a sulfonated aromatic hydrocarbon polymer as the electrolyte membrane together with high density electrode catalyst layers, consisting of high performance Pt nanoparticles, on either side of the membrane. This enables the reduction of the total MEA methanol crossover to one tenth that of the previous MEAs with fluorinated polymers, thus enabling the direct use of 30% methanol, which was previously too concentrated for passive fuel cells, resulting in higher capacity from passive fuel cells that are considered to be the most suitable for fuel cell downsizing.

By applying this technology, prototype micro fuel cells for mobile phones and notebook PCs were developed.

Application Examples

- Cellular phones
- Note PCs
- PDAs
- Digital still cameras
- Camcorders
- Portable audio devices