

High voltage generation and energy efficiency from microbial fuel cell using customized power management system

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The microbial fuel cell (MFC) employed exoelectrogenic biofilms on the electrode as a biocatalyst for electricity generation and useful chemical production using organic contaminants. However, due to their low power and voltage, the MFC need to apply voltage increasing system such as the power management systems (PMS). This study focused on characterizing the practical application using the MFC by the PMSs. We designed switching charging system of capacitor based boost circuit (CBBC), and then, several kinds of commercial DC/DC boost converters (DBC) were connected to provide a CBBC. The DBCs were affected primarily by output voltage of the CBBC that can be especially supplied continuously with high source voltage to the DBC. In the results, the CBBC evaluated from 0.77 to 1.54 V on the output voltage. In the CBBC-DBC connected, we compared with measuring time of charge by different DBCs. Especially, the LTC3429 charged in 5 sec until 3.3 V on 1000UF capacitor which is ten times faster than TPS61200 boost converter.