

Control and Development of a PEMFC Electric Bicycle

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Abstract

This paper proposed a hybrid fuel-cell electric bicycle that consists of a proton exchange membrane fuel cell (PEMFC) system and two LiFePO₄ battery sets. The study consists of three steps. First, we identified the PEMFC model by experiments and designed a robust controller to provide steady power to charge the battery sets, and to reduce hydrogen consumption. Second, we developed a serial power-train and suitable power management strategies for continuous operation of the electric bicycle. Lastly, the aforementioned PEMFC power module was integrated for experiment verification. Based on the results, the proposed PEMFC electric bicycle is deemed effective.