

# PEMFC 单片电压监测系统设计

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**摘要:** 质子交换膜燃料电池是一个封闭的发电装置, 电堆运行性能仅能通过单片电池电压进行反应。根据单片电池电压的暂态变换, 可以调整控制策略、工作条件, 使电堆运行在最佳状态, 延长其使用寿命。针对现有单片电池电压监测系统存在测量精度低、测量时间长等不足, 拟利用高速数据采集卡, 结合电阻分压及高速模拟切换开关, 构建一套单片电池电压监测系统, 实现单片电压的高速、高精度采集, 以满足燃料电池单片电压暂态分析的需要。经试验测试表明, 设计的监测系统平均误差为 4.52mV, 测量速度为 1ms 和 6ms, 测量速度、测量精度均比现有单片电压采集系统高。

**关键词:** 质子交换膜燃料电池; 单片电压; 电压采样; 模拟切换开关; 电阻分压; USB-6233

## Design of PEMFC Single Cell Voltage Monitoring System

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**Abstract:** The proton exchange membrane fuel cell is a closed power generation device, and the stack operation performance can only be reacted by a single cell voltage. The control strategy and working conditions can be adjusted according to the transient changes of the single cell voltage, to make the stack run at an optimal state and extend its life. In view of the existing single cell voltage monitoring system, there are shortcomings such as low measurement accuracy and long measurement time. It is proposed to build a single cell voltage monitoring system by using the high speed data acquisition card, combined with the resistor divider and high speed analog switch, to realize high speed and high precision acquisition of single cell voltage, so as to meet the needs of transient analysis of fuel cells single cell voltage. The test results show that the designed monitoring system has higher measuring speed and precision than the existing single cell voltage acquisition system. The average error is 4.52mV, the measurement speed is 1ms and 6ms.

**Keywords:** PEMFC; single cell voltage; voltage sampling; analog switch; resistor voltage divider; USB-6233