

Performance and stability of ethanol oxidation an alkaline-acid membraneless fuel cell

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The continuous flow operation of membraneless ethanol fuel cell using alkaline-acidic media is presented in this paper. In this cell, ethanol is used as the fuel and sodium perborate is used as an oxidant for the first time in an alkaline-acidic media. Sodium perborate generates hydrogen peroxide in aqueous medium. At room temperature, the laminar-flow-based microfluidic membraneless fuel cell can reach a maximum power density of 22.25 mW cm⁻² with a fuel mixture flow rate of 0.3 mL min⁻¹. The developed fuel cell features no proton exchange membrane. The simple planar structured membraneless ethanol fuel cell presents with high design flexibility and enables easy integration of the microscale fuel cell into actual microfluidic systems and portable power applications.

Keywords: Alkaline-acidic media, ethanol, membraneless ethanol fuel cell, portable power applications.