

36c High Performing Air Breathing Passive Direct Formic Acid Fuel Cell (Dfafc)

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A performance of an air breathing passive direct formic acid fuel cell (DFAFC) at room temperature is reported. Anode and cathode catalyst loadings were less than 8 mg/cm^2 . They were directly painted with 15 weight % of a polymer binder on a solid polymer electrolyte membrane. We found that our air breathing passive fuel cell, with a palladium anode catalyst, gives an excellent power output. It produced a high open cell potential of 0.9 V with ambient air. It produced current densities of 139 and 336 mA/cm^2 at 0.72 and 0.52 V, respectively. Its maximum power density was 177 mW/cm^2 at 0.53 V. Our air breathing passive fuel cell runs successfully with formic acid concentration up to 10 M with little degradation in performance. In this paper, its constant voltage test at 0.72 V is also demonstrated using 10 M formic acid. Additionally, a reference electrode was used to determine a distinct anode and cathode electrode performance for our air breathing passive fuel cell.