Hydrogen Purification using a Polymer Electrochemical Pump

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Current hydrogen production methods include:
- Steam Reforming
- Electrolysis
- Photolysis/Biologically-Inspired
Objectives

- Polymer Electrochemical Hydrogen Pump (PEcHP) is a promising means of recovering hydrogen from the reformate.

- Ascertain PEcHP performance under various operating conditions such as reformate ratios, temperatures, and flow rates.
Experimental Set-Up
Results

Pure Hydrogen 48 mL/min Temp 50°C

- Current (A)
- Voltage (V)
- Internal Resistance (Ohm)

<table>
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<tr>
<th>Time (s)</th>
<th>Voltage (V)</th>
<th>Current (A)</th>
<th>Internal Resistance (Ohm)</th>
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Results

Various H$_2$:CO$_2$ Ratios at 50°C and 36 mL/min Total Flow Rate
Conclusions/Future Work

- Robust performance in various experimental conditions
- Modify experimental set-up for better water management
- Attempt to quantify membrane degradation
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- Benziger Group
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