Mid Term Assignment
Assignment – Given Information

• Raw data at 80°C, 100% Relative Humidity
• 3 different oxygen concentrations at Cathode
• Current vs. voltage data
• Voltage corrected for membrane resistance (using current interrupt technique)
Assignment - Expected

- Very open ended
- **Given data – well suited for data analysis and estimation of overpotentials**
- Brute force fit – using multiple parameter equations – also possible
Assignment - Expected

• Phenomenological explanation of why the observed trends are seen

• An overpotentials “distribution” and its variation with oxygen concentration

• Suggestions on how to minimize various losses
Typical data analysis methodology

• Correct for membrane resistance – already done (IR Corrected voltage provided)
• Correct data for electrode ionic effects:
  - Forcing current ratio (oxygen / air) to equal 4.76
  - Similar approach, but using air and 4% oxygen (ratio = 5.25)
• Correct for substrate diffusion
• Any other sources of mass transport losses?
• Estimate kinetic parameters from corrected data
Data

• Data taken using oxygen, air and 4% oxygen in Nitrogen as oxidants and hydrogen as fuel at identical operating conditions provided for analysis.

• See excel file provided to you to access this data