

Session 3:

Before we get going



Any questions?



This session

What to expect?

- Final pieces of content about Hydrogen Fuel Cells
- Compare documents and literature to understand academic writing expectations.
- More opportunity to discuss progress on posters

Choice of materials

- The materials used and engineering design of fuel cells are essential for stability and performance.
- Different types of fuel cells (PEMFC, SOFC etc.) will have different requirements due to their different operating temperatures and power output.

Diagnostics

- As with all technology, with every solution, a new problem often arises.
- It is important to have characterisation, analysis and diagnostics tools capable of monitoring key parts to check for faults.

Diagnostics - Scribner

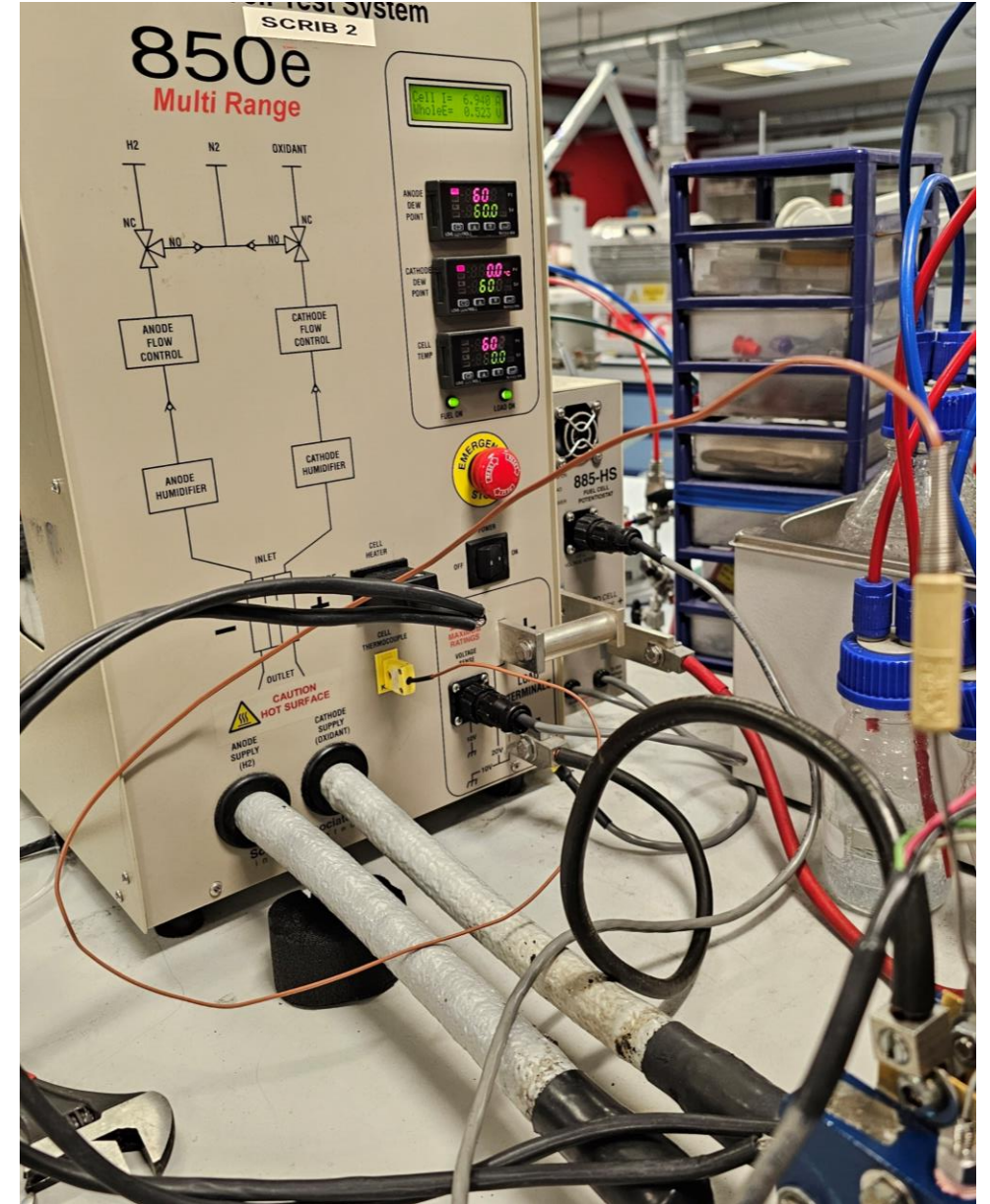
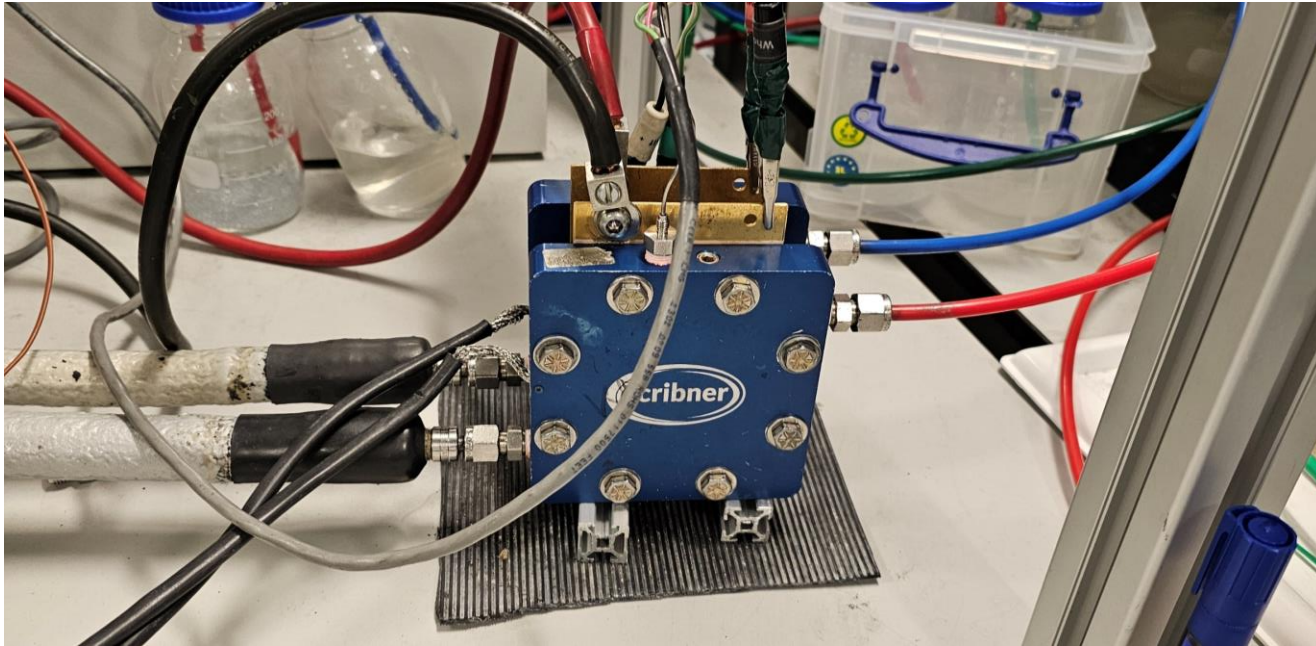
- A Scribner Fuel Test System is a key component for testing hydrogen fuel cells



Diagnostics - Scribner

- Simply, the Scribner is connected to software on a computer that controls the fuel input, fuel temperature, internal temperature, humidity, flow rate and much more.
- It also takes readings such as voltage.



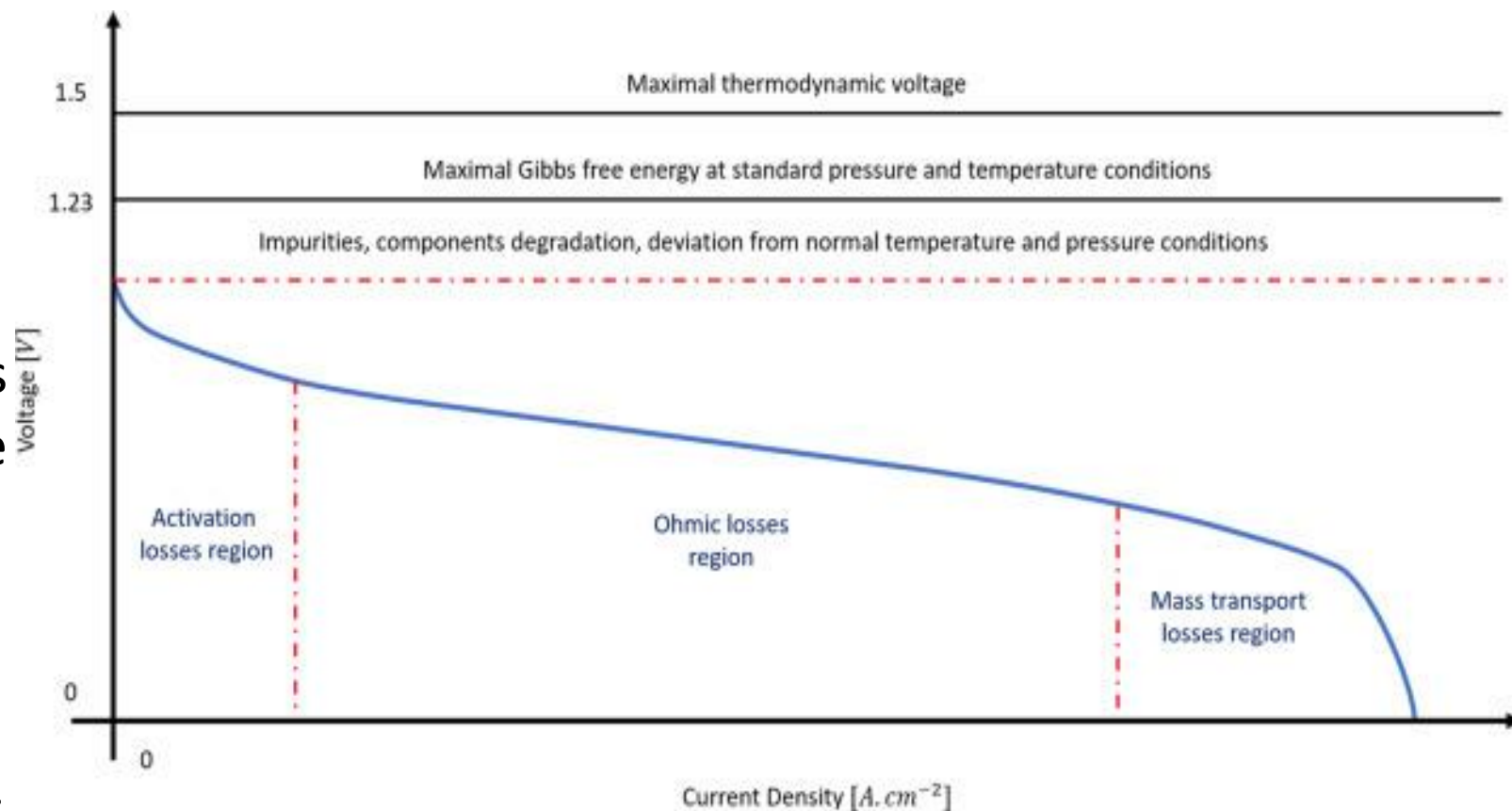


Diagnostics
- Scribner

A fuel cell fixture (pair of blue plates) is connected to the Scribner, allow for the testing for power output.

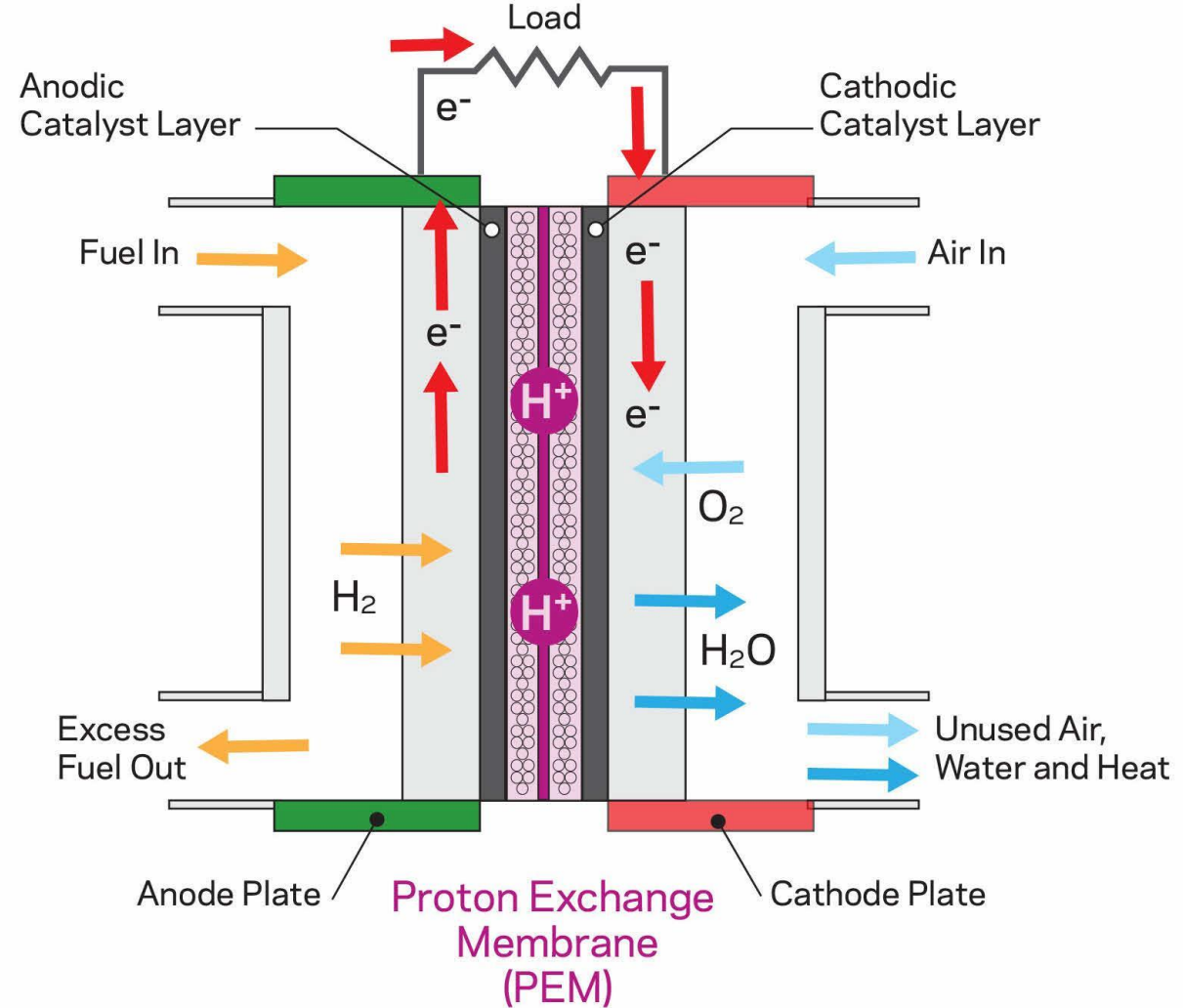
Diagnostics – Polarisation Curve

- Here, we have a representation of one important relationship while testing the Fuel Cell.
- Where the x-axis is Current Density and y-axis is Voltage, the combined relationship represents the ultimate power density of the Fuel Cell.
- The graphic also clearly shows how the voltage tends to decrease in different segments as we increase the current density



Materials - Membrane

- Referring to the previous graph. One part of the cell that must be analysed thoroughly in PEMFCs especially is the membrane.
- The membrane acts as a barrier between the two electrodes. Over time, this thin materials tends to break down through mechanical and thermal strain, as well as by chemically reacting.

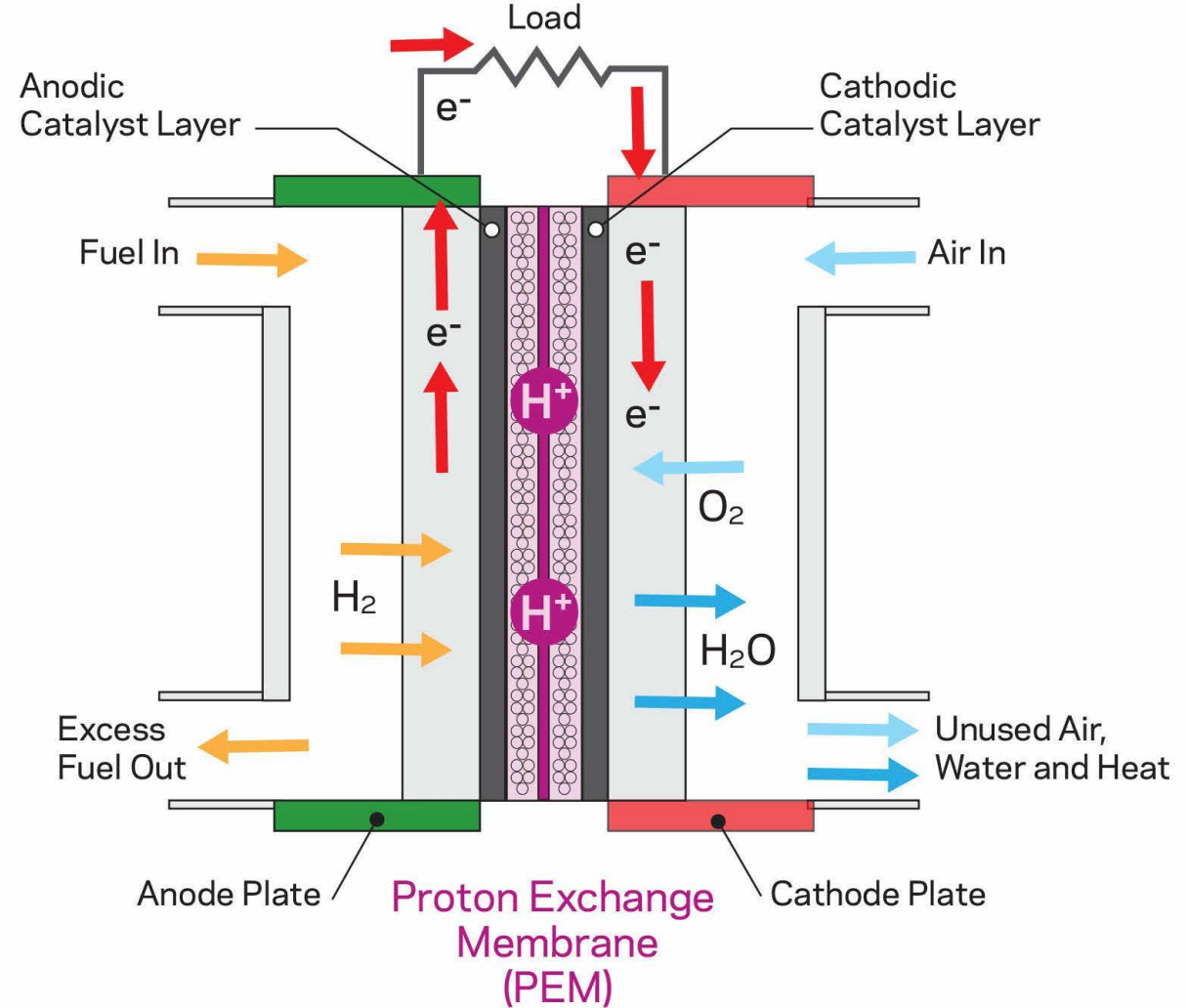


Proton Exchange Membrane (PEM)



Materials - Membrane

- The study of the membrane is of keen interest currently, and machines such as the Scribner allow us to analyse the performance of these membranes.
- Seeing what happens to these membranes overtime during operation can give us insight on how to reduce degradation



Proton Exchange Membrane (PEM)



Diagnostics – Thermal and Water Management



- Other key factors that need analysing are the thermal characteristics of a fuel cell. That is, are there any hotspots or cold spots forming?
- Hot spots and cold spots that come and go can often lead to cracking of integral parts.
- Additionally, analysing the flow of water inside cells, particularly for cooling the cells should be considered.

Diagnostics – Thermal and Water Management



Methods for thermal regulation and water management

- Thermal Imaging
- Acoustic Imaging

NOTE: Potential additions to your poster. Make sure to do your research.

Academic Writing Task 1



Comparing texts

On the resource website, find the document named “Academic Writing Task 1” from the 3rd session.

Take time to read the snippets and then discuss the 4 questions.

You will be split into 3 breakout rooms for a chance to discuss.

Academic Writing Task 1



Comparing texts

What did we learn?



Academic Writing Task 1

Comparing texts

What did we learn?

Academic writing needs to be:

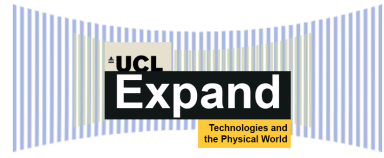
- Formal – showing professionalism
- Precise – no not skim out on any details. Provide all the information you can.
- Evidence based reasoning – have data!

Academic Writing Task 1

Is referencing important?

- The simple answer is yes.
- Having references at hand is always preferred so that you're better able to convey your point and back up your claims.
- Are you required to use references in your poster? No!

Breaktime



Academic Writing Task 2



Write your own summary!

On the resource website, find the document named “Academic Writing Task 2” from the 3rd session.

Take time to read the shorter snippet and try writing your own version in an academic style

Enter your paragraph into the google form.

Academic Writing Task 2



Remember to use this style in your poster!



Poster discussion/work



We will now be split into breakout rooms to discuss progress on our posters.

Use this time to actively work on the poster or to note down any interesting points that may be beneficial in developing your poster.

I encourage everyone to speak up so that everyone can have a good idea on where they all are!

Important reminder



The deadline to email
(wp.post16@ucl.ac.uk) your projects to
us to be printed/displayed is...

Sunday 24th March @ 23:59

Any questions?



Next steps

Before our next session...

- Start to finalise your poster!



What's coming up?

Drop-in sessions are run on the following evenings from 6pm – 7pm.

Monday 18th March

Monday 25th March

Your next subject session will be on the 20th of March from 6pm – 7:30pm.

Any questions?

If you need any support, or have any further questions, please don't hesitate to send the UCL Expand Team an email at wp.post16@ucl.ac.uk or drop us a text on **07857630033**.