DOI: https://doi.org/10.29121/ijetmr.v4.i8.2017.90

International Journal of Engineering Technologies and Management Research
A Knowledge Repository
IJETMR

TO STUDY AND ANALYSIS OF PEM FUEL CELL WITH VARIOUS TYPE OF PARAMETERS

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Abstract:
In this paper, we are observed the PEM fuel Cells, which are consist of anode plate, cathode plate, separator, oxygen gases, and hydrogen gases. Separators are used to between the anode plate and cathode plate. The various mass flow rates of oxygen gases and hydrogen gases are obtaining with the help of controlling valve of cylinders. In this way we are achieving the various voltages.

Keywords: *PEM Fuel Cel; Anode Plate; Cathode Plate; and Gas Diffusion Layers*.

Cite This Article: Dr. S. K. Mahobia. (2017). "TO STUDY AND ANALYSIS OF PEM FUEL CELL WITH VARIOUS TYPE OF PARAMETERS." *International Journal of Engineering Technologies and Management Research*, 4(8), 17-21. DOI: 10.29121/ijetmr.v4.i8.2017.90.

1. Introduction

The PEM fuel cell are electrical power storages system, which produced the voltages using of combination of oxygen gases and hydrogen gases. The separators are placed between the anode plates and cathode plate. We are using the voltmeter for the purpose of the measuring of the voltages of PEM fuel cells. Various voltages are achieving from increase the temperatures of PEM fuel cells. Temperatures are obtaining in PEM fuel cells with the help of electrical power supply.

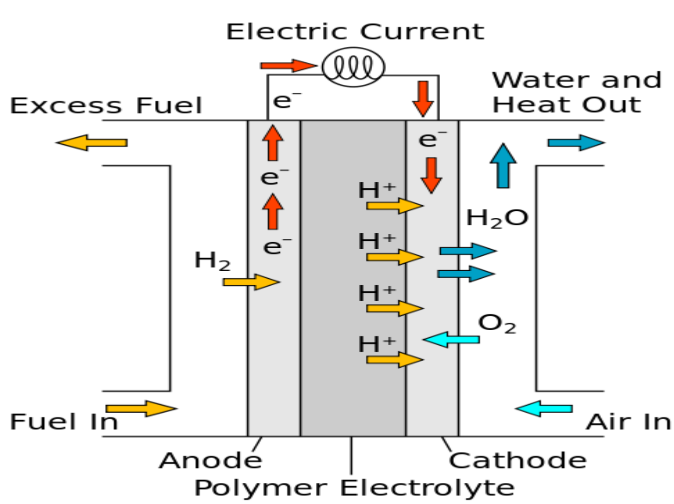

Figure 1: The PEM fuel cell

ISSN: 2454-1907
DOI: 10.5281/zenodo.889028

2. Testing Process Using Various Parameters

Table 1: Apply the 2 atm back pressure and hydrogen flow rates are 1.0 m liter/ s and Oxygen flow rates 1.0 m liter/ s.

Sr. No.	**Current density (A/cm^2)**	**Voltage at fuel cell Temperature 40 ° C**	**Voltage at fuel cell Temperature 50 ° C**
1	**0.2**	**0.78**	**0.82**
2	**0.4**	**0.72**	**0.73**
3	**0.6**	**0.60**	**0.67**
4	**0.8**	**0.57**	**0.60**
5	**1.0**	**0.55**	**0.57**
6	**1.2**	**0.45**	**0.47**

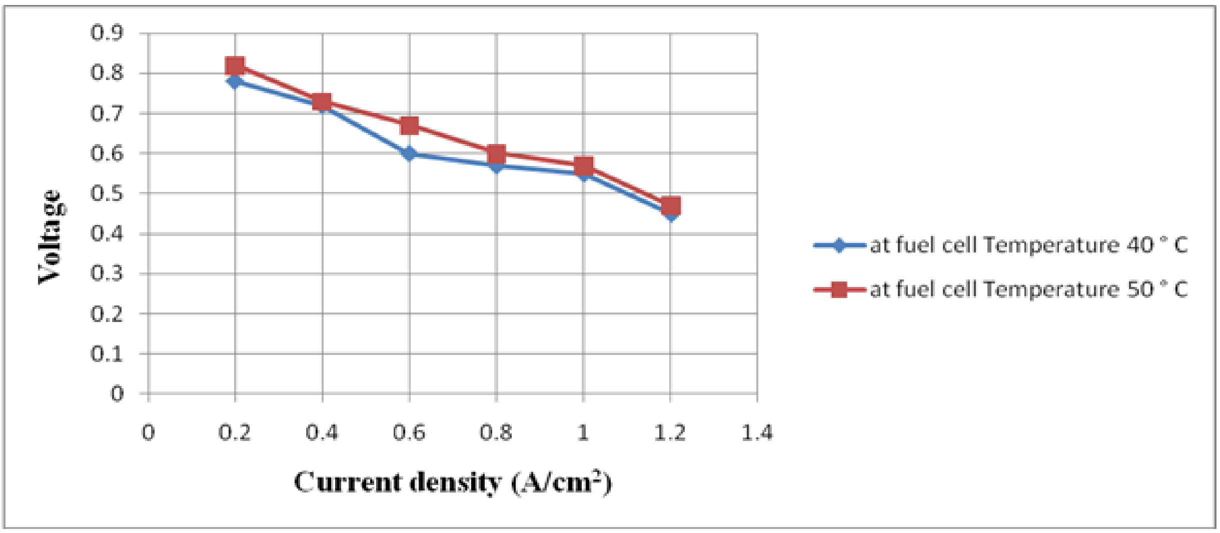

Figure 2: Apply the 2 atm back pressure and hydrogen flow rates are 1.0 m liter/ s and Oxygen flow rates 1.0 m liter/ s.

Table 2: Apply the 2 atm back pressure and hydrogen flow rates are 2.0 m liter/ s and Oxygen flow rates 2.0 m liter/ s.

Sr. No.	**Current density (A/cm^2)**	**Voltage at fuel cell Temperature 40 ° C**	**Voltage at fuel cell Temperature 50 ° C**
1	**0.2**	**0.82**	**0.88**
2	**0.4**	**0.77**	**0.82**
3	**0.6**	**0.68**	**0.76**
4	**0.8**	**0.62**	**0.68**
5	**1.0**	**0.59**	**0.62**
6	**1.2**	**0.52**	**0.58**

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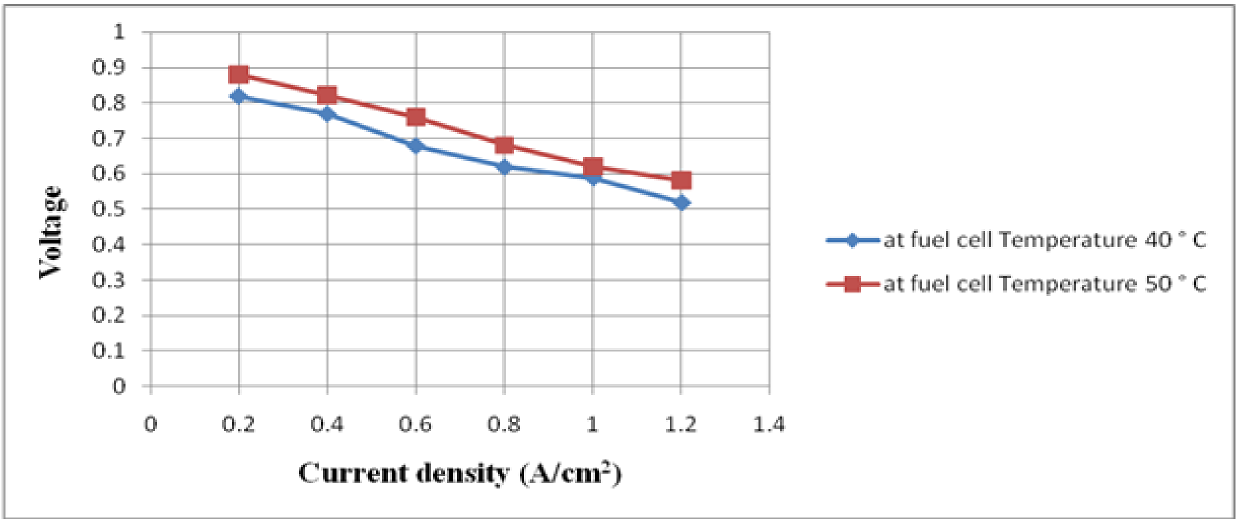

Figure 3: Apply the 2 atm back pressure and hydrogen flow rates are 2.0 m liter/ s and Oxygen flow rates 2.0 m liter/ s.

Table 3: Apply the 2 atm back pressure and hydrogen flow rates are 3.0 m liter/ s and Oxygen flow rates 3.0 m liter/ s.

Sr. No.	Current density (A/cm^2)	Voltage at fuel cell Temperature 40 ° C	Voltage at fuel cell Temperature 50 ° C
1	0.2	0.89	0.92
2	0.4	0.85	0.88
3	0.6	0.82	0.84
4	0.8	0.77	0.78
5	1.0	0.68	0.75
6	1.2	0.57	0.62

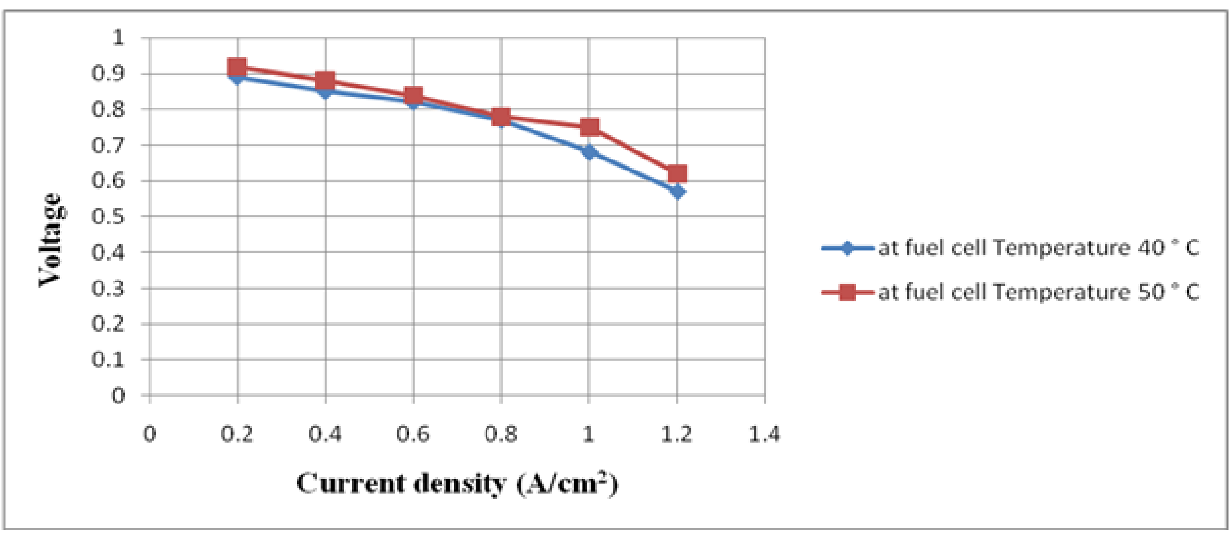

Figure 4: Apply the 2 atm back pressure and hydrogen flow rates are 3.0 m liter/ s and Oxygen flow rates 3.0 m liter/ s.

ISSN: 2454-1907
DOI: 10.5281/zenodo.889028

Table 4: Apply the 2 atm back pressure and hydrogen flow rates are 4.0 m liter/ s and Oxygen flow rates 4.0 m liter/ s.

Sr. No.	Current density (A/cm^2)	Voltage at fuel cell Temperature 40 ° C	Voltage at fuel cell Temperature 50 ° C
1	0.2	0.95	1.02
2	0.4	0.88	0.99
3	0.6	0.83	0.85
4	0.8	0.77	0.82
5	1.0	0.72	0.75
6	1.2	0.62	0.67

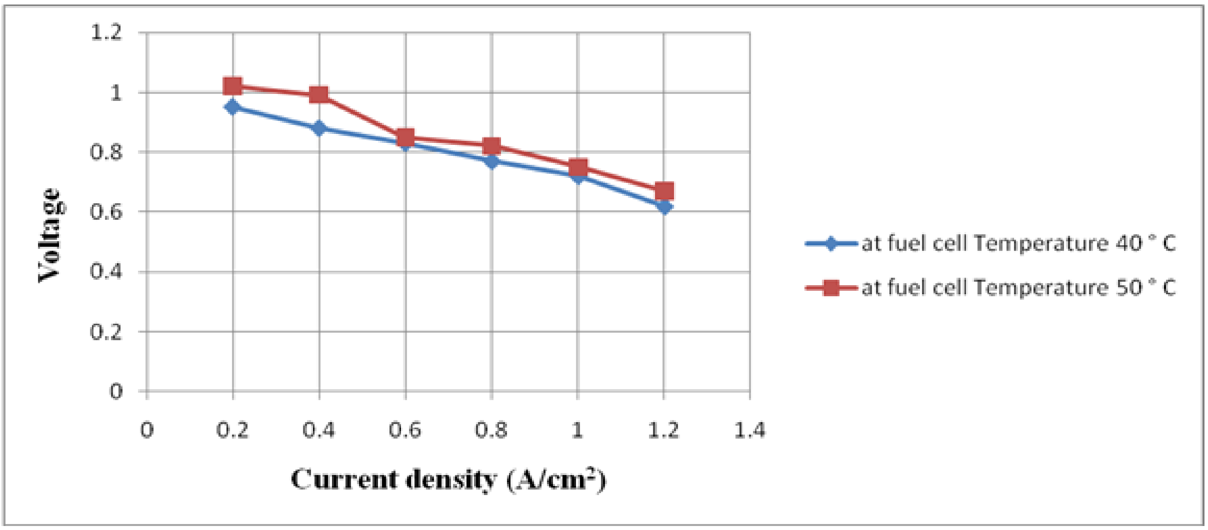

Figure 5: Apply the 2 atm back pressure and hydrogen flow rates are 4.0 m liter/ s and Oxygen flow rates 4.0 m liter/ s.

Table 5: Apply the 2 atm back pressure and hydrogen flow rates are 5.0 m liter/ s and Oxygen flow rates 5.0 m liter/ s.

Sr. No.	Current density (A/cm^2)	Voltage at fuel cell Temperature 40 ° C	Voltage at fuel cell Temperature 50 ° C
1	0.2	0.99	1.10
2	0.4	0.92	1.02
3	0.6	0.87	0.98
4	0.8	0.82	0.88
5	1.0	0.78	0.82
6	1.2	0.73	0.77

ISSN: 2454-1907
DOI: 10.5281/zenodo.889028

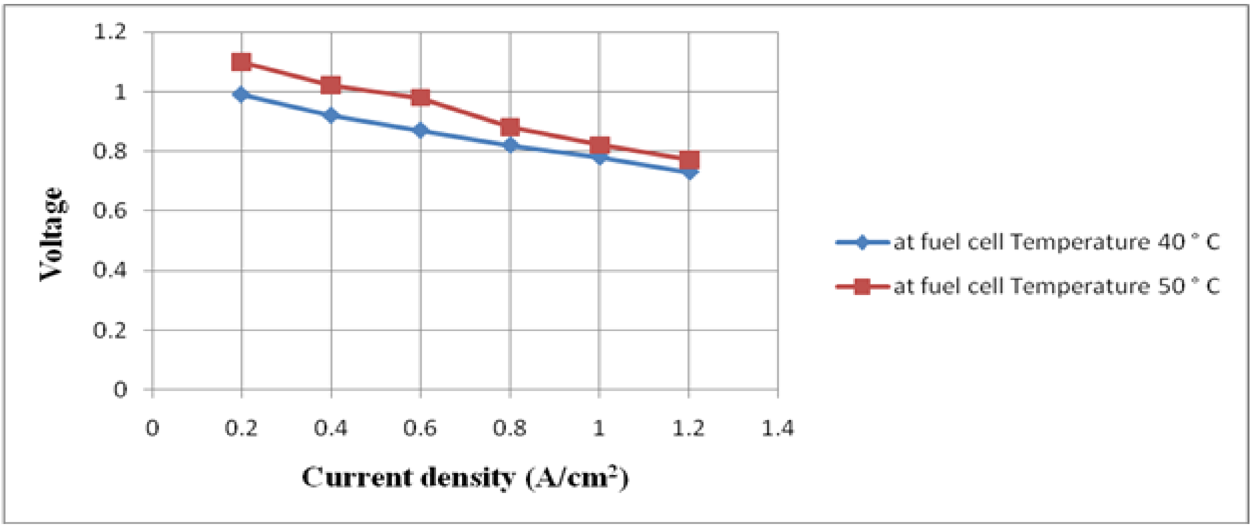

Figure 6: Apply the 2 atm back pressure and hydrogen flow rates are 5.0 m liter/ s and Oxygen flow rates 5.0 m liter/ s.

3. Conclusion

In this paper we are finding out the D.C. power supply from PEM fuel cells. Temperatures are increases and mass flow rate of oxygen gases and hydrogen gases. Finally we are achieving the maximum 1.10 V.D.C. at fuel cell Temperature are 50 ° C, which are shown in Table.5.

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