**Experiment (6)** **Using a PEM Fuel cell to Power the Small Car Wheel Module**



**(i) Components Used**

* PEM Fuel Cell
* Hydrogen and Oxygen storage cylinders
* Water supply and electrolyte tubes
* Connecting wires (Red and Black)
* Small car wheel module (motorized propeller)
* Stand and support base

**(ii) Objectives**

* To demonstrate the generation of electricity using a PEM fuel cell
* To convert chemical energy (from hydrogen and oxygen) into electrical energy
* To power a mechanical load (small car wheel module) using fuel cell output
* To explore real-world hydrogen energy applications

**(iii) Procedure**

1. First, we ensured the hydrogen and oxygen storage cylinders were filled using an electrolyzer (charged earlier using solar panel in previous experiments).
2. The PEM fuel cell was connected to the gas cylinders using the correct tubing (ensuring no leaks).
3. We connected the output terminals of the PEM fuel cell to the small car wheel module using red (positive) and black (negative) wires.
4. Upon successful connection, hydrogen began to flow into the fuel cell, initiating the electrochemical reaction.
5. The car wheel module's propeller began to spin, indicating that the fuel cell was generating electricity and powering the motor.

**(iv) Observations**

* The fan/wheel started spinning a few seconds after connection — confirming successful power generation.
* Speed was moderate, suggesting steady hydrogen flow.
* Once hydrogen depleted, the module slowed and stopped — confirming hydrogen was the only power source.
* No noise or pollution was observed, demonstrating a clean energy process.

**(v) Precautionary Measures**

* We verified all tube connections to avoid gas leakage.
* We Checked the polarity of electrical connections before powering the module.
* We ensured the fuel cell was dry and clean before use.
* We kept hands and wires away from the spinning motor for safety.
* We performed the experiment in a well-ventilated space.