Name of the Technology: **Carbon Composites Bipolar Plates for Hydrogen based Fuel Cell Applications**

Summary: Fuel cell is electrochemical device that convert chemical energy of the reactants (H_2 and O_2) directly into electricity & heat with high efficiency. The main components of PEM fuel cell are composite bipolar plate, porous carbon paper electrode, polymer electrolyte membrane and platinum catalyst. Carbon composites bipolar plate is a multi-functional component within the PEM fuel cell stack. It connects and separates the individual fuel cells in series to form a fuel cell stack with required voltage, it main function is uniform distribution of fuel gas and oxygen over the whole active surface area of the membrane-electrode assemblies (MEA), conducts electrical current from the anode of one cell to the cathode of the next, facilitates water management within the cell, supports thin membrane and electrodes and clamping forces for the stack assembly, among other things. Essentially the composites bipolar plates are light weight and the electrically-conducting plates which join together the anode of one cell to the cathode of another.NPL has developed the graphite and expanded graphite based composites bipolar plates of following properties;

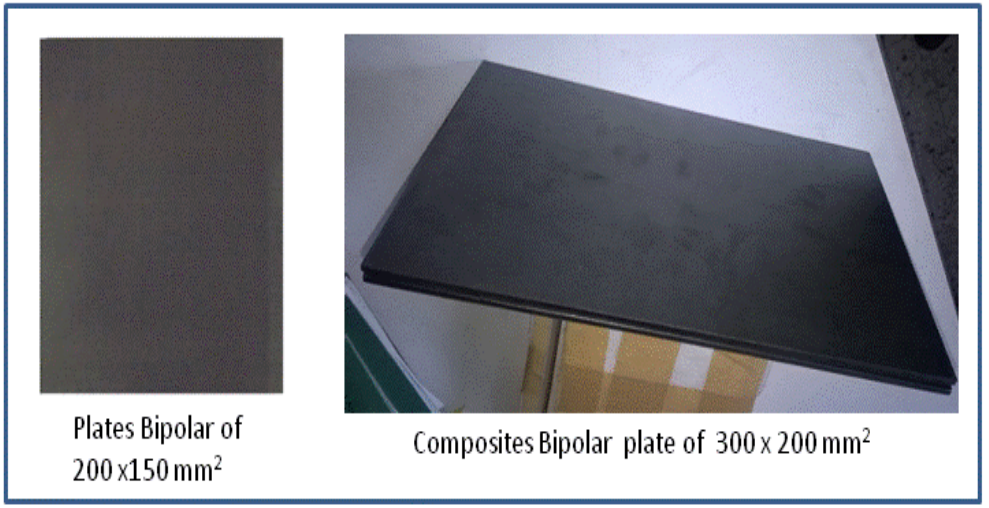

Figure: Graphite and expanded graphite composites bipolar plate of different sizes.

Properties	**Graphite composite bipolar plate**	**Expanded graphite bipolar plate**
Bulk Density (g/cc)	>1.90	< 1.60
Bending strength (MPa)	>50	40
Modulus (GPa)	>15	12
Compressive strength (MPa)	>40	25
Shore Hardness	>55	45
Electrical conductivity in plane (S/cm)	>150	>200
Electrical conductivity through plane (S/cm)	>40	>30

Applications: Fuel cell (PEM, DMFC, Phosphoric acid)

Advantages: Low cost and indigenously developed

Choose the Readiness level of the Technology:

Idea	Concept Definition	Proof of Concept	Prototype	Lab Validation	Technology Development	Technology Demonstration	Technology Integrated	Market Launch

Related Patents:
Patent No: 766/DEL/2010; Country: India ; Publication Date: Not published till date; Grant Date: not available; Year of Introduction: 2009; **Broad Area/Category:** Chemical Engineering /Fuel cell

User Industries: Fuel cell industries