

Name of the Technology: Porous Conducting Carbon Paper as a Fuel Cell Electrode

Summary:

Carbon paper acts as the backing layer of the electrode in a fuel cell, thus providing mechanical support to the MEA. It not only assists in the conduction of electrons, but also provides reactant gas access from the flow field channels of bipolar plate to the catalyst layer and passage for removal of product water in the other direction. The above requirements impose stringent conditions on its properties, including high conductivity, permeability, strength and porosity with a uniform pore size distribution. The NPL developed Carbon paper shown in Figure and properties of carbon paper are given in Table.

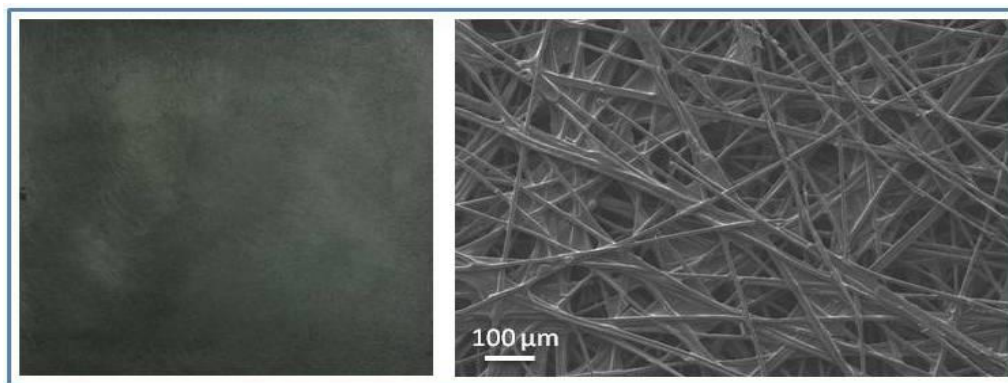


Figure: Micrograph of 20 cm × 20 cm size carbon paper and SEM image of Carbon paper

S. No	Properties (unit)	Values
1.	Thickness (mm)	0.28 ± 0.02 mm
2.	Density (g/cc)	0.5 ± 0.02 g/cc
3.	Electrical conductivity (S/cm)	> 200 S/cm
4.	Flexural strength (MPa)	> 40 MPa
5.	Flexural modulus (GPa)	10 ± 2 GPa
6.	Porosity (%)	> 75 %
7.	Pore tortuosity	< 1.4
8.	Gas permeability (ml cm ⁻² min ⁻¹ mm Aq ⁻¹)	25

**Applications:**

Backing layer for polymer electrolyte membrane assembly in hydrogen based PEM fuel, Direct Methanol Fuel Cell, Phosphoric acid fuel cell, filtration, anode material for lithium ion batteries etc.

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

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Broad Area/Category: Chemical Engineering /Fuel cell

User Industries: Fuel cell industries

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