# Performance evaluation of an Air Breathing –Direct Methanol Fuel Cell with different Cathode Current Collector

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## Abstract

Development of alternative technologies for the generation of clean energy is the focus of research at present scenario. Fuel cells are promising option in this regard. Among the different types of fuel cells, Air Breathing-Direct Methanol Fuel Cell (AB-DMFC) is finding a prime place as power source for charging the portable electronic devices. In the operation of AB-DMFC, the design and construction of the cathode current collector is pivotal, since the cathode current collector performs important functions: collecting the electrons, facilitating the flow of oxygen for cathode reaction and evacuating the water bubbles at the cathode side. The present paper aims in analysing the performance of an AB-DMFC, by incorporating two different current collector designs viz.,wire mesh type current collector, made of stainless steel 316L, and perforated current collector with an open ratio of 45.40% on cathode side. On anode side of the fuel cell, single serpentine flow channel engraved on graphite plate is used. Experimental analysis is carried out to examine the effect of current collector design on the performance of the cell. Further, the fuel cell performance is analysed by varying the operating parameters such as methanol flow rate and methanol concentration.

***Keywords:*** Air breathing-Direct methanol fuel cell, wire mesh cathode current collector, perforated cathode current collector, Fuel cell performance and Single serpentine graphite flow field.

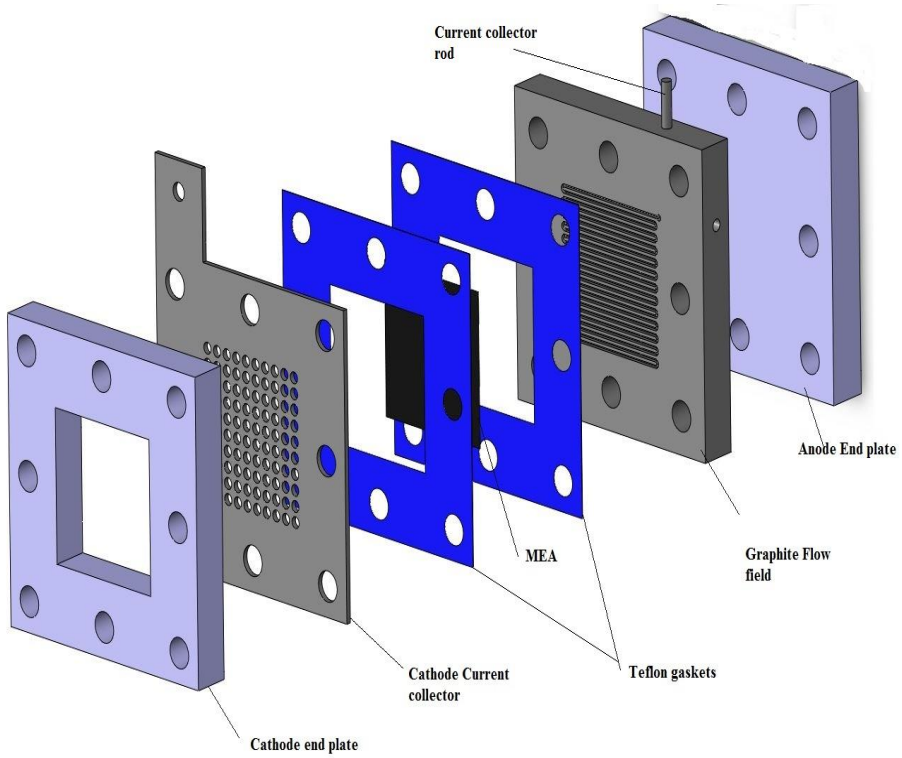
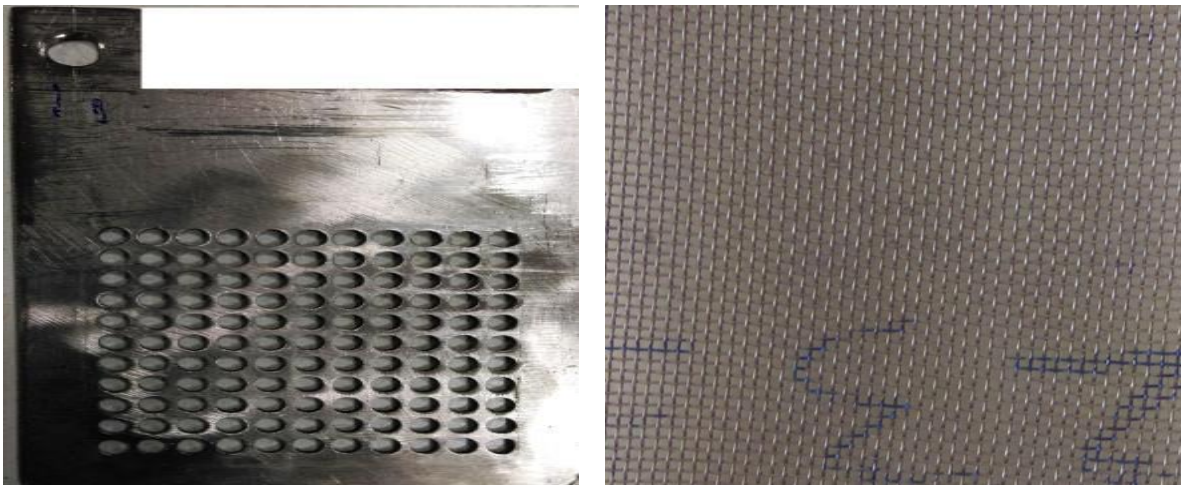



Fig. 1. Schematic of air breathing direct methanol fuel cell



(a) (b)

Fig. 2. Cathode current collectors (a) perforated (b) wire mesh