

Direct Methanol Fuel Cell (DMFC) Market Shares Strategies, and Forecasts, Worldwide, Nanotechnology, 2010 to 2016

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Abstracts

WinterGreen Research announces that it has a new study on Direct Methanol Fuel Cell Market Strategy, Market Shares, and Market Forecasts. The 2010 study has 279 pages, 66 tables and figures. Worldwide markets are poised to achieve significant growth as a new generation of portable electronics has need for longer power on times. DMFC is positioned to provide longer power on times with rapid refill of charging liquid. Units are expected to reach cost parity with thin film batteries by the end of the forecast period. Demand for more portable electricity is coming with the increased use of broadband cell phones, laptop computers, and tablet PCs.

According to Susan Eustis, the lead author of the study, "the use of DMFC is a breakthrough for portable energy delivery. Throughout the forecast period DMFC miniature fuel cells are expected to be able to enable consumers to talk for up to a month continuously on a cellular phone without recharging." Fuel cells change the telecommuting world, powering laptops and digital handheld devices. Personal digital devices work for hours. DMFCs run longer than batteries. The fuel is abundant and available.

The single largest direct-methanol fuel cell (DMFCs) market driving force is that devices can be used in airplanes. Approvals came after safety standards were in place. The International Civil Aviation Organization and the US Department of Transportation have allowed methanol fuel cells and their cartridges to be carried in the passenger cabin of airplanes.

This means air travels will start to buy them. The convenience and the longer life for power is a compelling advantage. To keep an executive, manager, or service person

working while traveling provides an increase in productivity. Software engineers can work more productively while commuting.

DMFC is a subset of the proton exchange membrane (PEM) fuel cell technology. The direct methanol fuel cell or DMFC is emerging as a significant energy source for some cell phone and laptop applications. DMFC emergence is viable in the portable device sector. Commercialization is driven by consumer demands and desires for a power source that can operate alone or as a supplement synergistically with existing advanced battery technologies.

DMFC technology is used to power consumer-portable devices. Applications are achieved through continuing research and innovation. Micro fuel cells are being developed. These are showing efficiency rates close to 40 percent.

Methanol is the type of material used in the fuel cell stack to generate the chemical reaction (electrolyte) needed to make electricity. DMFC fuel cells emit fewer pollutants than other forms of energy generation, they have the potential to use 50 % less energy than internal combustion engines and 30 % less energy than conventional gas-fired power plants.

Nanotechnology improves fuel cells. Nanotechnology is used for making fuel cell catalysts. Catalysts are used with fuels such as hydrogen or methanol to produce hydrogen ions. Platinum, which is very expensive, is the catalyst typically used in this process. Companies are using nanoparticles of platinum to reduce the amount of platinum needed, or using nanoparticles of other materials to replace platinum entirely and thereby lower costs.

Nanotechnology is providing significant breakthroughs in catalysts that provide improvements in capability. Through extensive catalyst development and use of superior membrane materials, QuantumSphere has developed MEA technology that allows the direct methanol fuel cell to operate with up to 10X higher methanol fuel concentrations, without a sacrifice in power, which can directly lead to as much as a ten times reduction in size and weight of the fuel tank.

QSI's catalyst solution uses lower cost metals, engineered at the nano scale, to replace platinum. Palladium is one example, as it resembles platinum chemically, is extracted from copper-nickel ore, and is already used as a catalyst material in the catalytic converters of automobiles. Palladium is also about 70% less expensive than platinum, and when used at the nano scale in direct methanol fuel cells, it has demonstrated an

increased power density of 45%.

Fuel cells run on methanol, an inexpensive alcohol used in windshield wiper fluid. This DMFC market has as the earliest adapters users of laptop computers, particularly for the military. These users are dependent on mobile electronics. Electronics needs to operate in the field for long times and needs rapid recharging. Military applications, enhanced cell phones and other hand held devices lead adoption of DMFCs into the consumer markets.

Small portable devices are well suited, in terms of storage, safety, and energy density, to use of methanol as a fuel for fuel cells. Direct hydrogen feed for fuel cells requires complicated storage and would take much more space in small portable devices. There is also the safety issue of compressed hydrogen being allowed on airplanes. Cartridges of methanol can fit into existing retail channels or be available from OEMs. Methanol cartridges could be available through any number of delivery channels and accepted without difficulty into the consumer market.

Direct Methanol Fuel Cell (DMFC) market forecasts indicate markets at \$65.6 million in 2009 are anticipated to reach \$1.1 billion by 2016. DMFC will account for 85% of the portable fuel cell market by the end of the forecast period.

Companies Profiled

Toshiba
ViaSpace
Arrowhead Research Corporation
Unidym Carbon Nanotechnologies
BASF
BIC
Cabot Corporation
Celanese
Ceres Power
ClearEdge Power
DTI Energy Inc. (DTI)
DuPont
Hitachi
IRD Fuel Cell Technology A/S MEA Manufacturing Line From Cabot Corporation
Jadoo Power

Johnson Mathley
LG CHEM
Manhattan Scientifics
Neah
Oorja
Panasonic
PolyFuel
Tokai
Viaspace / Direct Methanol Fuel Cell Corporation
Direct Methanol Fuel Cell Corporation Business Partners
Fuel Cells Nanotechnology Company Directory
MTI Micro
UltraCell
Cabot
Johnson Matthey Fuel Cells
Energy AG / SFC Smart Fuel Cell AG
IRD A/S
QuantumSphere
Advent Technologies SA
Altair Nanomaterials, Inc.
BWT (Best Water Technology)
Dupont Fuel Cells
Nafion® Membranes and Dispersions
FuMA-Tech a division of BWT AG German web site
Hoku Scientific
Hydrocell Ltd
Ion Power, Inc.
ITM Power Ltd
PolyFuel
NexTech
Cell Impact AB
3M 5-94
Altek Fuel Group
Celanese
Dupont Fuel Cells
Electrochem
Gore™ Fuel Cell Technologies
Hoku Scientific
IRD A/S

Pacific Fuel Cell Corp.
PEMEAS
Umicore pMembrain
Johnson Matthey Fuel Cells
Ballard Power Systems
Dana Corporation

Report Methodology

This is the 458th report in a series of market research reports that provide forecasts in communications, telecommunications, the internet, computer, software, and telephone equipment. The project leaders take direct responsibility for writing and preparing each report. They have significant experience preparing industry studies. Forecasts are based on primary research and proprietary data bases. Forecasts reflect analysis of the market trends in the segment and related segments. Unit and dollar shipments are analyzed through consideration of dollar volume of each market participation in the segment. Market share analysis includes conversations with key customers of products, industry segment leaders, marketing directors, distributors, leading market participants, and companies seeking to develop measurable market share. Over 200 in-depth interviews are conducted for each report with a broad range of key participants and opinion leaders in the market segment.

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