



2013 North American Advanced Battery Technology Innovation Award



F R O S T & S U L L I V A N



50 Years of Growth, Innovation & Leadership

Technology Innovation Award Advanced Battery North America, 2013

Frost & Sullivan's Global Research Platform

Frost & Sullivan is in its 50th year in business with a global research organization of 1,800 analysts and consultants who monitor more than 300 industries and 250,000 companies. The company's research philosophy originates with the CEO's 360-Degree Perspective™, which serves as the foundation of its TEAM Research™ methodology. This unique approach enables us to determine how best-in-class companies worldwide manage growth, innovation and leadership. Based on the findings of this Best Practices research, Frost & Sullivan is proud to present the 2013 North American Technology Innovation Award in Advanced Battery to mPhase Technologies, Inc.

Significance of the Technology Innovation Award

Key Industry Challenges Addressed by mPhase Technologies Inc.

Energy storage systems, such as batteries, are crucial for the realization of modern policies toward higher utilization of non-fossil energy sources, including renewable energy. Conventional batteries utilize nickel (Ni)-cadmium (Cd), Ni-zinc (Zn), and lithium (Li)-ion batteries. While these are effective for normal day-to-day use, they are quite inefficient when used as high performance power sources. In addition, the electrolytes used in these batteries are toxic and produce significant amounts of battery waste that are hazardous to the environment.

Apart from conventional batteries, reserve batteries (stand-by batteries) are also available in the market; these are used as smart batteries due to their long shelf life (refers to the period prior to usage of the battery power). However, in many cases, reserve batteries have been large, bulky, heavy, and expensive to build, and contain large areas of wasted space due to mechanical separators inside the battery. As such, the current uses of reserve batteries are restricted to military and large industries. Considering these factors, Frost & Sullivan feels that there definitely exists the market need for novel battery technologies that will help facilitate widespread adoption of the reserve batteries, and also enhance the effectiveness of conventional batteries.

Toward addressing the above needs, mPhase Technologies has developed an innovative battery technology using nanomaterials. The company has used nanomaterials, such as carbon nanotubes, carbon nanowires, and super hydrophobic nanostructured materials for the development of its nanostructured battery technology, mainly due to the wide availability and unique properties of the nanomaterials. Frost & Sullivan notes that one of the unique features about the company's battery technology is that the electrode and electrolyte is separated by a membrane that is super-hydrophobic in nature, and also

electrodes inside the battery are divided into cells. This prevents the loss of active material during storage and helps in reducing the toxicity of the electrolyte solution. This smart nanobattery can be used in a wide range of sectors including energy, electronics, health, defense, and transportation.

Frost & Sullivan is of the opinion that mPhase Technologies' smart nanobattery has the necessary ability to address the challenges that are associated with conventional (Ni)-cadmium (Cd), Ni-zinc (Zn), lithium (Li)-ion batteries, and also reserve batteries. The developed battery technology is sustainable, inexpensive, easy to handle, and possesses long shelf life. All of these features make mPhase Technologies quite unique over competitors' battery technology solutions.

Key Benchmarking Criteria for Technology Innovation Award

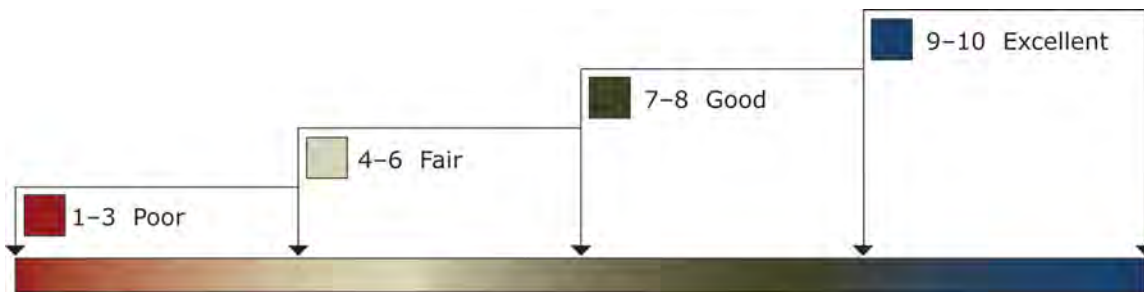
For the Technology Innovation Award, the following criteria were used to benchmark mPhase Technologies' performance against key competitors:

- Uniqueness of Technology
- Impact on New Products/Applications
- Impact on Functionality
- Impact on Customer Value
- Relevance of Innovation to Industry

Decision Support Matrix and Measurement Criteria

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Matrix (DSM). The DSM is an analytical tool that compares companies' performance relative to each other with an integration of quantitative and qualitative metrics. The DSM features criteria unique to each Award category and ranks importance by assigning weights to each criterion. The relative weighting reflects current market conditions and illustrates the associated importance of each criterion according to Frost & Sullivan. Fundamentally, each DSM is distinct for each market and Award category. The DSM allows our research and consulting teams to objectively analyze each company's performance on each criterion relative to its top competitors and assign performance ratings on that basis. The DSM follows a 10-point scale that allows for nuances in performance evaluation; ratings guidelines are shown in Chart 2.

Chart 2: Performance-Based Ratings for Decision Support Matrix



This exercise encompasses all criteria, leading to a weighted average ranking of each company. Researchers can then easily identify the company with the highest ranking. As a final step, the research team confirms the veracity of the model by ensuring that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

Chart 3: Frost & Sullivan’s 10-Step Process for Identifying Award Recipients



Best Practice Award Analysis for mPhase Technologies, Inc.

The Decision Support Matrix, shown in Chart 4, illustrates the relative importance of each criterion for the Technology Innovation Award and the ratings for each company under evaluation. To remain unbiased while also protecting the interests of the other organizations reviewed, we have chosen to refer to the other key players as Competitor 1 and Competitor 2.

Chart 4: Decision Support Matrix for Technology Innovation Award

<i>Measurement of 1-10 (1 = lowest; 10 = highest)</i>	Award Criteria					
	Uniqueness of Technology	Impact on New Products/Applications	Impact on Functionality	Impact on Customer Value	Relevance of Innovation to Industry	Weighted Rating
Relative Weight (%)	20%	20%	20%	20%	20%	100%
mPhase Technologies, Inc.	9.1	9.1	9.2	8.7	9.1	9.04
Competitor 1	8	8.1	7.75	8.1	8.2	8.03
Competitor 2	8	8	7.5	7.5	7.5	7.7

Criterion 1: Uniqueness of Technology

mPhase Technologies developed the nanostructured battery, also referred as the cell-array battery, with at least one electrode in the battery which has been divided into cells. By limiting the penetration of the electrolyte only to a specific cell, the voltage and current generated by the battery can be controlled easily resulting in increased battery life. For the purpose of limiting the penetration of electrolyte to specific cell, the company has designed a proprietary nanomaterial-based membrane using standard silicon processing techniques. The battery can be activated only by introducing the electrolyte into the electrode. By separating the electrolyte from the electrode, deterioration of active material during storage is prevented. In addition, this eliminates the reduction of battery capacity due to self-discharge before use.

mPhase Technologies has developed batteries using the nanomaterial membrane for specific applications. For example, it has developed zinc-manganese dioxide (Zn/MnO₂) batteries for low energy density applications used in a flashlight or TV remote control. The company is currently focusing on developing lithium-manganese dioxide (Li/MnO₂) batteries for higher energy density applications such as laptops, cell phones, and digital cameras using the developed battery technology. These characteristic features of mPhase Technologies' nanobattery solution give it a definitive edge over other competitors in the market.

Criterion 2: Impact on New Products/Applications

mPhase Technologies' battery technology has the ability to provide a longer shelf life compared to conventional batteries; this facilitates its use for military and homeland

security applications. Another advantage is that the technology reduces the time needed for activation of the batteries. Unlike the competitor's technologies, the company's technology can be used for providing a high performance power source for electronic devices and also for low energy density applications. The company's technology also facilitates in an easy integration of electronic components directly into the manufacturing process of a battery. This will help in the development of different classes of tightly integrated devices, such as wireless sensors, integrated active radio frequency identification (RFID) tags, and lab-on-the-chip systems for both defense and commercial markets.

Criterion 3: Impact on Functionality

The smart nanobattery technology developed by mPhase Technologies has increased power, high-energy density, and longer shelf life (15 to 20 years). Challenges associated with conventional batteries, including self-discharge, power drain, and leakage, are eliminated; activation time is also less than that of conventional batteries (1 Millisecond). This technology is compatible with a wide range of compounds and chemistries, including lithium and zinc. Additionally, the cell-array battery can illustratively alter the toxic electrolytes inside the battery. The electrolyte solution gets in contact with the nanostructure membrane and cell and the chemical composition of the electrode becomes less toxic.

Another key distinguishing property of the nanobatteries is "power on command". Power on command is the ability of the user to remotely activate the battery. Activation is commenced by causing the chemicals to mix, electrochemical reactions to occur, and power to be supplied to an electronic device. The technology also facilitates activation of the battery easily by means of remote control switches and triggering mechanisms, such as mechanical jolts, electrical pulses, and wireless signals.

Criterion 4: Impact on Customer Value

mPhase Technologies' nanobattery has the ability to minimize battery waste and is therefore environmentally friendly. This is mainly due to the longer shelf life feature of the nanobattery, as frequent battery replacements are eliminated. In addition, nanobatteries are less bulky, offer a cost-effective means for mass production, and are safe to operate due to a less toxicity feature. Since nanobatteries are compatible with all semiconductor devices, it can be used for a larger number of applications in electronics, military, and transportation sectors. Frost & Sullivan expects that these features will further increase mPhase Technologies' inherent customer value, especially by eliminating the need for frequent battery changes and also reducing the battery waste.

Criterion 5: Relevance of Innovation to Industry

The nanobattery technology has the potential to capitalize on the ongoing eco trend across all industries. mPhase Technologies' initial goal was to incorporate the benefits of having emergency power available when the user needs it through the reserve batteries developed using proprietary technology. The company has also patented the cell-array battery

technology. The company is continuously innovating in the nanobattery field to widen the nanobattery applications in different industry verticals, including transportation and consumer electronics.

Conclusion

mPhase Technologies' nanobattery, based on innovative nanotechnology, overcomes the relevant industrial challenges of conventional batteries and provides an efficient and cost-effective energy storage solution. mPhase Technologies' nanobattery also possesses longer shelf life. This solution's power on-command feature nicely provides energy anytime the user needs it through a simple command for activation. Frost & Sullivan is therefore proud to present the 2013 Advanced Battery Technology Innovation Award to mPhase Technologies.

The CEO 360-Degree Perspective™ - Visionary Platform for Growth Strategies

The CEO 360-Degree Perspective™ model provides a clear illustration of the complex business universe in which CEOs and their management teams live today. It represents the foundation of Frost & Sullivan's global research organization and provides the basis on which companies can gain a visionary and strategic understanding of the market. The CEO 360-Degree Perspective™ is also a “must-have” requirement for the identification and analysis of best-practice performance by industry leaders.

The CEO 360-Degree Perspective™ model enables our clients to gain a comprehensive, action-oriented understanding of market evolution and its implications for their companies' growth strategies. As illustrated in Chart 5 below, the following six-step process outlines how our researchers and consultants embed the CEO 360-Degree Perspective™ into their analyses and recommendations.

Chart 5: The CEO's 360-Degree Perspective™ Model

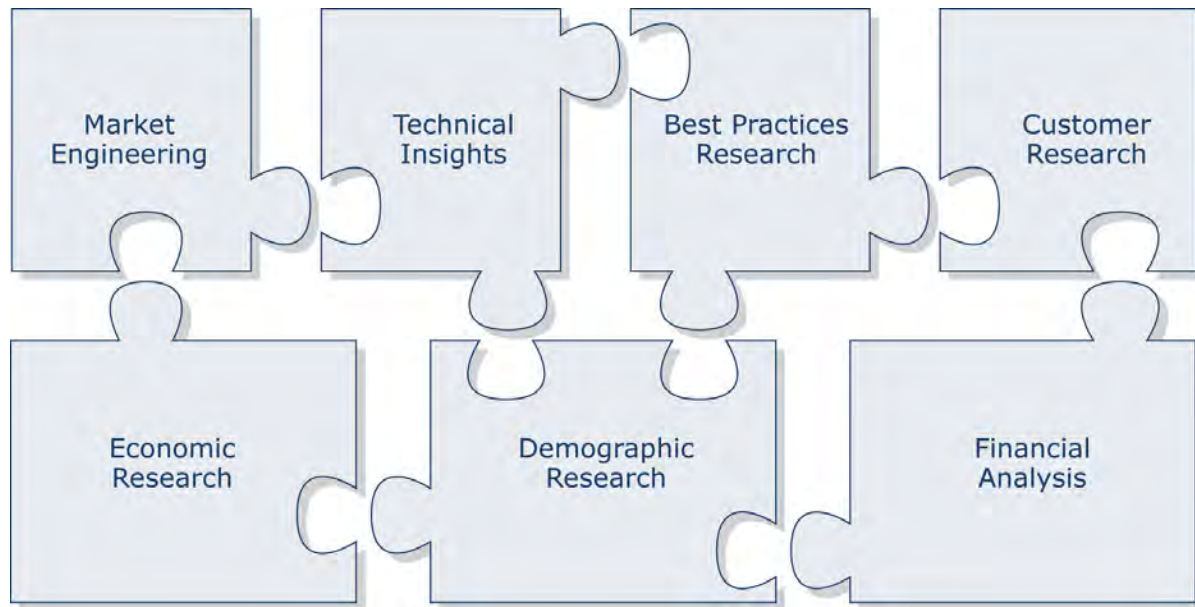


Critical Importance of TEAM Research

Frost & Sullivan’s TEAM Research methodology represents the analytical rigor of our research process. It offers a 360-degree view of industry challenges, trends, and issues by integrating all seven of Frost & Sullivan's research methodologies. Our experience has shown over the years that companies too often make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Frost & Sullivan contends that successful growth strategies are founded on a

thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. In that vein, the letters T, E, A, and M reflect our core technical, economic, applied (financial and best practices) and market analyses. The integration of these research disciplines into the TEAM Research methodology provides an evaluation platform for benchmarking industry players and for creating high-potential growth strategies for our clients.

Chart 6: Benchmarking Performance with TEAM Research



About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best-in-class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best-practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from more than 40 offices on six continents. To join our Growth Partnership, please visit <http://www.frost.com>.