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Solid State Thin Film Battery: Market Shares, Strategies, and Forecasts, Worldwide, Nanotechnology, 2013 to 2019

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Abstracts

WinterGreen Research announces that it has a new study on Solid State Thin Film Battery, Market Shares and Forecasts, Worldwide, 2013-2019. The 2013 study has 344 pages, 151 tables and figures.

Batteries are changing. Solid state batteries permit units to be miniaturized, standalone, and portable. Solid-state batteries have advantages in power and density: low-power draw and high-energy density. They have limitations in that there is difficulty getting high currents across solid-solid interfaces.

Power delivery is different in solid state thin film batteries, - there is more power per given weight. The very small and very thin size of solid state batteries helps to reduce the physical size of the sensor or device using the battery. Units can stay in the field longer. Solid state batteries can store harvested energy. When combined with energy harvesting solid state batteries can make a device stay in the field almost indefinitely, last longer, power sensors better.

Temperature is a factor with batteries. The solid state batteries work in a very broad range of temperatures, making them able to be used for ruggedized applications. Solid state batteries are ecofriendly. Compared with traditional batteries, solid state thin film batteries are less toxic to the environment.

Development trends are pointing toward integration and miniaturization. Many technologies have progressed down the curve, but traditional batteries have not kept pace. The technology adoption of solid state batteries has implications to the chip grid. One key implication is a drive to integrate intelligent rechargeable energy storage into

the chip grid. In order to achieve this requirement, a new product technology has been embraced: Solid state rechargeable energy storage devices are far more useful than non-rechargeable devices.

Thin film battery market driving forces include creating business inflection by delivering technology that supports entirely new capabilities. Sensor networks are creating demand for thin film solid state devices. Vendors doubled revenue and almost tripled production volume from first quarter. Multiple customers are moving into production with innovative products after successful trials.

A solid state battery electrolyte is a solid, not porous liquid. The solid is denser than liquid, contributing to the higher energy density. Charging is complex. In an energy-harvesting application, where the discharge is only a little and then there is a trickle back up, the number of recharge cycles goes way up. The cycles increase by the inverse of the depth of discharge. Long shelf life is a benefit of being a solid state battery. The fact that the battery housing does not need to deal with gases and vapors as a part of the charging/discharging process is another advantage.

According to IBM, the world continues to get 'smaller' and 'flatter'.Being connected holds new potential: the planet is becoming smarter because sensors let us manage the environment. Intelligence is being infused into the way the world works.

Sensor networks are being built as sensors are integrated into the systems, processes and infrastructure that comprise surroundings. These sensor networks enable physical goods to be developed, manufactured, bought and sold with more controls than were ever available before.

That sensor network allows services to be delivered. Sensors facilitate the movement of everything from money and oil to water and electrons in a controlled environment. That is positioned to help millions of people work and live in a middleclass lifestyle.

How is this possible? The world is becoming interconnected. The world is becoming instrumented. Sensors are being embedded everywhere: in cars, appliances, cameras, roads, pipelines. Sensors work in medicine and livestock management.

Systems and objects can 'speak'to each other in machine to machine networks. Think of a trillion connected and intelligent things, and the oceans of data they will produce, this is the future.

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Nanostructured or nano-enabled batteries are a new generation of lithium-ion batteries and battery systems to serve applications and markets. Nano-enabled batteries employ technology at the nano-scale, a scale of minuscule particles that measure less than 100 nanometers, or 100x10-9 meters.

Traditional lithium-ion (Li-Ion) technology uses active materials, such as lithium cobalt-oxide or lithium iron phosphate, with particles that range in size between 5 and 20 micrometers. Nano-engineering improves many of the failings of present battery technology. Re-charging time and battery memory are important aspects of nano-structures. Researching battery micro- and nanostructure is a whole new approach that is only just beginning to be explored.

Industrial production of nano batteries requires production of the electrode coatings in large batches so that large numbers of cells can be produced from the same material. Manufacturers using nano materials in their chemistry had to develop unique mixing and handling technologies.

The efficiency and power output of each transducer varies according to transducer design, construction, material, operating temperature, as well as the input power available and the impedance matching at the transducer output.

Cymbet millimeter scale solid state battery applications are evolving. In the case of the Intra-Ocular Pressure Monitor, it is desirable to place microelectronic systems in very small spaces. Advances in ultra-low power Integrated Circuits, MEMS sensors and Solid State Batteries are making these systems a reality. Miniature wireless sensors, data loggers and computers can be embedded in hundreds of applications and millions of locations.

Various power factors have impinged on the advancement and development of micro devices. Power density, cell weight, battery life and form factor all have proven significant and cumbersome when considered for micro applications. Markets for solid state thin-film batteries at $65.9 million in 2012 are anticipated to reach $5.95 billion by 2019. Market growth is a result of the implementation of a connected world of sensors.

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