



Pyrotek Graphitization Facility Expansion Project – COMPLETED

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PYROTEK, INCORPORATED
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#ARRAVT016

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Pyrotek

SANBORN, NY FACILITY EXPANSION

**GRAND OPENING
SEPTEMBER 20, 2011**

**THIS FACILITY IS DEDICATED TO ALLAN ROY AND FAMILY,
OWNERS OF PYROTEK INCORPORATED, WHO HAVE EMBRACED
THIS OPPORTUNITY FOR PURSUING ADVANCED
GRAPHITE TECHNOLOGY.**

**THIS PROJECT WAS DEVELOPED IN COOPERATION WITH
CONOCOPHILLIPS COMPANY, AND WITH FUNDING
ASSISTANCE FROM THE US DEPARTMENT OF ENERGY – NETL,
WELLS FARGO BANK, THE EMPIRE STATE DEVELOPMENT
CORPORATION, NEW YORK STATE HOMES & COMMUNITY
RENEWAL, AND NATIONAL GRID. A POWER ALLOCATION
FOR THE PROJECT WAS PROVIDED BY THE
NEW YORK POWER AUTHORITY.**



Pyrotek

Expansion Project Overview

Timeline

- » Award Start – March 2010
- » Award Finish – January 2013
- » 100% Complete as of December 2011

Budget

Total project funding \$25.6M

- DOE share - \$11.3M
- Pyrotek share - \$14.3M
- Funding as of Dec 2011 - \$25.6M

Barriers

All project risks have been met and surpassed.

Partners

- Pyrotek is a strategic partner with ConocoPhillips in the production of a high performance anode material, which is marketed and sold by ConocoPhillips as CPreme®*.
- Pyrotek is a key member of a USA lithium-ion battery supply chain, as our graphitization technology, coupled with ConocoPhillips' precursor material, has proven to provide superior anode properties.

* Trade name use authorized by ConocoPhillips.



Expansion Project Overview

Pyrotek, Incorporated (“Pyrotek”) is a privately owned US based company that was founded in 1956, in Spokane, WA. Metallurgical Systems, a Division of Pyrotek, utilizes proprietary furnaces within our Sanborn, NY plant to heat treat materials to extremely high temperatures (graphitization). Due to the high demand for electricity required by our graphitization process, the plant utilizes low cost, Niagara Falls hydro-power available through the New York State Power Authority.

The DOE Funding Opportunity, DE-FOA-0000026, provided grants to support the construction of USA based manufacturers of batteries and electric drive components. The grant awarded to Pyrotek was used to expand our manufacturing capacity, and enabling Pyrotek to bring a high performance anode material to the market in volumes that correspond with the demand from the automotive industry.



Expansion Project Relevance

Pyrotek Project Objectives Status

1. Successfully increased anode material production capacity at the Pyrotek Sanborn plant, to meet higher projected EV, PHEV and HEV demands.
2. Working on production efficiencies to decrease processing costs to ultimately provide a lower priced material to the lithium-ion battery manufacturers.
3. Successfully met the objectives of ARRA2009 by creating and preserving construction and manufacturing jobs within the United States.

Expansion Project Approach (pg1)

Originally planned as a two-phased project, the timing of the DOE Award enabled Pyrotek to complete a larger, single phased project:

- added 93,000 sq feet of manufacturing space to our existing plant,
- installed and commissioned (10) new high volume furnaces (with space for (8) additional furnaces when warranted by demand),
- installed and commissioned specialty material handling equipment for pre- and post-graphitization efforts,
- are utilizing a hydro power allocation from the New York Power Authority, needed for the low cost, high temperature processing, and
- have completed hands-on training of new employees alongside of our experienced graphitization department staff, which ensured a qualified staff was in place when the new equipment was brought online.


Expansion Project Approach (pg2)

Data collection, bar code system tracks all material by lot numbers, keeping track of inventory and processing status. Material quality testing is being performed after the completion of each processing step to ensure the desired anode material properties are achieved and provided to the battery manufacturers.

The Award period was established to run from March 11, 2010 through January 31, 2013. Initial project plans and engineering started in October 2009, ground was broken in July, 2010, and the project was successfully completed by December 31, 2012, well in advance of the three year Award period.



Project Accomplishments (pg1)

Milestone Title	Milestone Description	Planned Start Date	Planned End Date
Final Facility Design Complete	Facility drawings for RFQ process	10/1/2009	4/20/2010 completed
NEPA/FONSI Approved	All testing & research completed, & project management requirements established	11/10/2009	4/8/2010 completed
Site Groundbreaking	All site work - to include bldg demolition, grading, water retention, preliminary road work, foundations, etc	6/1/2010	7/15/2010 completed
Building & Concrete Complete	Steel structure erected & concrete pad completed	9/5/2010	5/1/2011
Initial Equipment Order – Installation	Install and setup of material handling equipment, as well as initial bank of 3 furnaces	5/10/2010	5/31/2011
Initial Equipment Commissioning	Starting, testing, calibrating of high technology equipment - to include initial test runs of material for certification	1/15/2011	6/15/2011
Project Complete	Facility through landscaping is completed, and all equipment (including 12 furnaces) are installed and commissioned	10/1/2009	12/31/2012 

Expansion Accomplishments (pg2)

The following pages provide a pictorial view of the project accomplishments through December, 2012.





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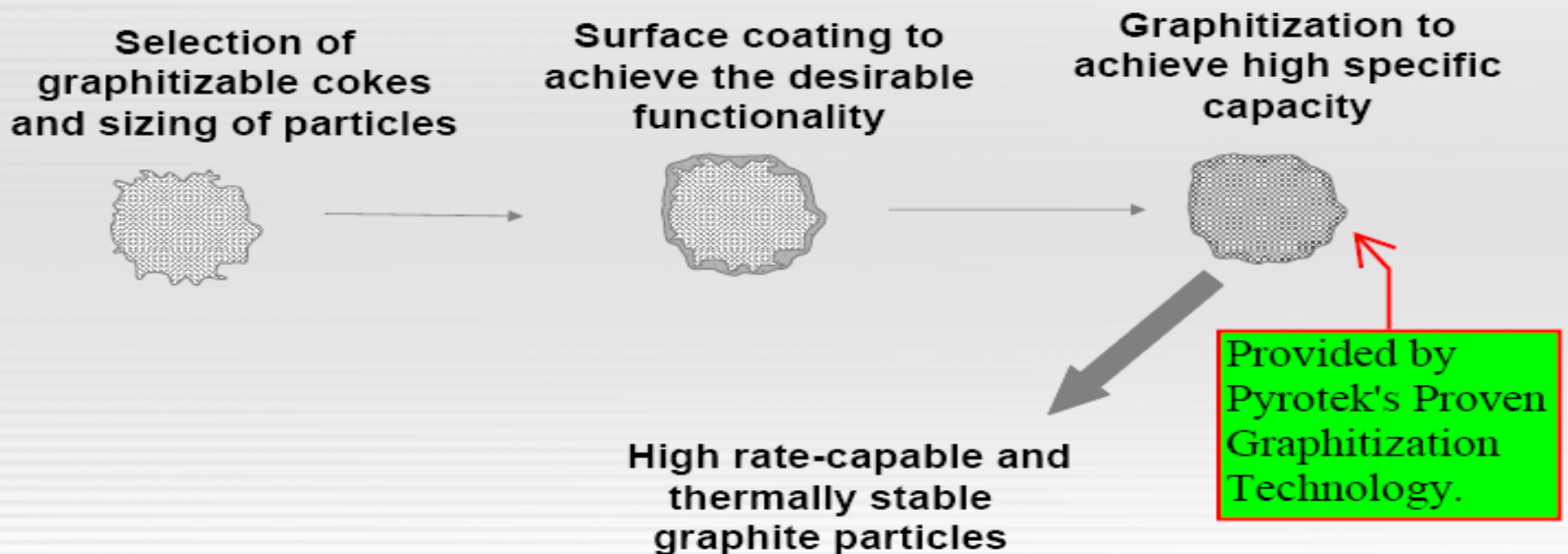




Project Technology (pg1)

The anode material is presently being produced and has already been qualified as a high performance anode material for the lithium-ion battery market, and the domestic automotive industry.

ConocoPhillips Technology Platform



Project Technology (pg2)

Technological advantages of CPreme®* include:

- a longer battery life due to a more stable anode material,
- a higher discharge rate, resulting in a smaller battery for HEVs, higher thermal stability for a safer battery, and
- the ability to develop ultra high power anodes for other challenging applications.

Project Technology (pg3)

Expanded CPreme[®] Product Line

<u>Product</u>	<u>Application</u>	<u>Advantages</u>
G Series	Power & Energy Automotive HEV, PHEV	Excellent 1 st cycle eff., low heat release, high rate capacity, long life
A Series	Energy Automotive EV, PHEV	High capacity, excellent 1 st cycle eff., low heat release, high anode density, long cycle life, good power capacity,
M Series	Power Automotive HEV	Excellent compatibility with Mn-spinel cathode, high rate capacity, low cost, long life
P Series	Power Automotive HEV	High rate capacity, good 1 st cycle eff., low cost, good cycle life

Project Partnerships (pg1)

The anode material that Pyrotek processes belongs to our customer, ConocoPhillips, the leading domestic manufacturer of high performance anode materials for lithium-ion batteries. Their product, CPreme®*, has been adopted for use in power tool, defense, automotive and utility load management applications. It is based on patented technology and proprietary processing developed by ConocoPhillips, and has been shown to provide superior performance over the industry benchmark.

As stated earlier, one of the objectives of this project was to increase the production volume of this superior anode material through expanded facilities. Increasing production is also tied to efforts to increase the throughput of each graphite furnace. Now that the facility expansion has been completed, Pyrotek and ConocoPhillips will work closely to improve furnace throughput, which are expected to provide reducts in the manufacturing costs of the material.

* Trade name use authorized
by ConocoPhillips.



Project Summary

In summary, the benefits derived from this project include:

- developing a global leadership position within the USA for providing high performance anode graphites for automotive and other demanding applications, since all R&D, production and marketing for CPreme®* is based in the USA.
- employing USA labor for the facility construction, equipment manufacturing, adding (46) production & administrative positions at Pyrotek, over (50) high quality positions at ConocoPhillips, and employment throughout the full domestic supply chain.
- Employment opportunities are expected to grow beyond Pyrotek, ConocoPhillips and the supply chain, as the business continues to scale up.

More Information on Pyrotek

Website: www.pyrotek-inc.com

Key anode material project personnel:

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More Info on CPreme®* Anode

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