In this issue:
- Message from the CEO
- Powdermet wins U.S. Navy contract for thermal battery anode materials
- CVD technology to CVD Technology to Produce Low-energy Uranium
- Powdermet wins NorTech 2012 Innovation Award for MComP™
- Powdermet wins Leading EDGE award
- Ryan Reese to advance specialty materials processing
- Dr. Aaron LaLonde leads thermal battery development

Message from the CEO

Although our primary focus has been on structural materials, in this issue of NanoMatters the focus is more on our materials for batteries and nuclear fuels. Our capabilities in these areas have developed from our Energetics Research Center, which supports our EnComP™ (energetic composites) product line.

Energetic composites are a class of materials that are engineered for the storage and release of energy. They can be designed to release high amounts of stored energy, change the rate that energy is released, or increase or decrease the sensitivity of a compound to shocks and impacts.

Variations of these energetic composites include propellants, nanothermites, explosives, thermobarics, materials for hydrogen storage, battery anodes and cathodes, fuel cell components, and pyrotechnic compositions. Our processing methods allow us to tailor the performance of a material by applying the appropriate coating and energetic material formulation, and by adjusting/controlling the energy release rate, burn time, and burn temperature.

Our growing capabilities in these areas allow us to tackle projects that others cannot begin to address. Let us help you with your energetic materials research and development.


Ranked by Award Amount, Powdermet was #13 for Improved Metal-Polymeric Laminate Radiation Shielding (NASA, $599,999) and #23 for Nano-Aluminum Forgings for Lightweight Transportation Applications (National Science Foundation, $149,999).

For more information on these exciting technologies, contact Jerry Willnecker, New Business Associate.

Who we are...

The core of Powdermet technology is a hierarchically structured nanocomposites building block platform.

Powdermet’s technology is based on the design and production of engineered particle building blocks that incorporate nano-, micro-, and meso-scale structural features engineered into safe, free flowing particle delivery system.

What we do...

These engineered particles incorporate metals, ceramics, and polymers with compositions and phase distributions engineered and controlled on...
Powdermet to Supply Battery Materials to the US Navy

Powdermet has entered into a contract with the United States Navy to investigate safer, higher-rate, higher-energy-density thermal batteries through the development of improved nanocomposite anode materials. Specifically, nanocomposite lithium-silicon is to be developed to replace traditional lithium as the anode material.

This new anode material will be made of carbon-supported nanostructured lithium-silicon dispersed in a solvent compatible with battery manufacturing methods. To make the anode, we will develop stable nanocomposite particles by microencapsulation with electrolyte-soluble polycarbonate binders. With these materials, our goal is to prepare a nanocomposite anode tape with high adhesion through high-velocity spraying techniques.

Thermal batteries have a working temperature in the range of 500° to 700°C (930° to 1300°F), with power output ranging from a few watts to several kilowatts. These specialized batteries operate for only a few hours, and are primarily used in missiles, rockets, and torpedoes.

For more information, contact Jerry Willnecker, New Business Associate.

CVD Technology to Produce Low-energy Uranium

Battelle Energy Alliance LLC subcontracted Powdermet to investigate designing and building a fluidized chemical vapor deposition (CVD) reactor to produce low-energy uranium for the Reduced Enrichment Research and Test Reactor Program (RERTR). The program’s purpose was to eliminate the need for highly-enriched uranium fuel to prevent its use in nuclear weapons.

The reactor was based on Powdermet's Fast Fluidized Bed Chemical Vapor Deposition process that enables the production of metal-coated fine powders. Developed by Powdermet president, Andrew Sherman, the technology is based on particles kept in suspension by the rapid motion of gaseous materials that deposit on the particles. The process provides outstanding versatility, produces coated particles with excellent homogeneity, is low in cost, and allows for close process control.

For more information on our CVD technology, please contact Jerry Willnecker, New Business Associate.
Powdermet Wins NorTech 2012 Innovation Award for MComP™

Powdermet won the award because its MComP™ (micro/nanocomposite) metals offer high strength-to-weight ratios. These aluminum and magnesium composites enable reduced weight while maintaining high strength. By controlling the microstructure at the nano-scale, MComP™ materials can be designed for specific applications and are ideal for products requiring high strength and stiffness as well as low weight.

For example, ALiB-MComP™ combines aluminum with two other lightweight and high specific-stiffness elements: boron and lithium, at the nano-level. The combination of these lightweight (lithium 0.5g/cc) and high modulus (boron E=400GPa) reinforcements enable the composite to greatly exceed standard aluminum properties and still retain the weight savings that lithium gives the alloy.

To learn more about MComP, please contact Jerry Willnecker, New Business Associate.

Powdermet Wins Leading EDGE Award

Powdermet was recognized as one of the 101 mid-sized companies driving value for Northeast Ohio at the 2012 Crain’s Leading EDGE Awards at the University of Akron on May 16.

Qualifying companies operate within the 17 counties of Northeast Ohio and generate revenues up to $750 million, a portion of which must be outside the region. Honored companies were identified by the value they create in our
regional economy, based on a sum of their EBIT (earnings before interest and taxes) and total taxable compensation for all Northeast Ohio-based employees.

“Mid-sized companies are the backbone of our regional economy,” said Kirk Neiswander, president of the Entrepreneurs EDGE. “They have the greatest potential to grow and create more value for Northeast Ohio. Value through spin-off businesses and meaningful job creation. Value through spending with local vendors. Value because they are dedicated to the region and less likely to pick up and leave. They deserve our recognition and support.”

Ryan Reese to Advance Specialty Materials Processing

Powdermet, Inc.'s Energetics Research Center supports the Ryan Reese has joined the Powdermet team as a Mechanical Engineer.

He graduated from the University of Akron in 2011 with a degree in Mechanical Engineering Technology. He is responsible for the design, implementation, and installation of specialty materials processing equipment to aid the efforts of the R&D team.

Dr. Aaron LaLonde Leads Thermal Battery Development

Dr. Aaron LaLonde has joined the Powdermet team as a Research Engineer. He graduated from Michigan Technological University with a Ph. D. in Materials Science and Engineering in 2010.

He has researched the processing, characterization, and development of thermoelectric material at the California Institute of Technology, and has authored several scholarly articles on the subject. At Powdermet, he leads the technical efforts to build process improvements for producing thermal batteries through improved nanocomposite anode materials.