

Case Study: Ignite™ Success Stories

From Spark to Finish

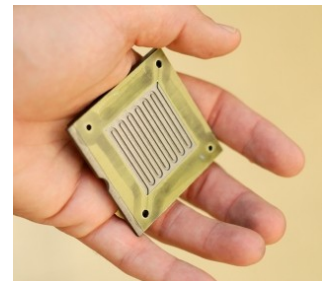
Harper's Ignite™ process enables companies in the development of advanced materials, from the lab to full commercialization, helping make their ideas a reality. Utilizing our depth and breadth of experience in thermal processing, we partner with our customer to ensure success as they scale up their operations.



Harper's support to emerging industries begins in early stages of research and development, whether at corporate R&D centers, universities, government institutions, or start-ups. Our mission is to assist these customers in turning the next generation of material innovations into profitable new markets. Learn more about these success stories of customers who are paving the path of material science innovations.

Activated Carbon Development

EnerG2 began working with Harper in 2009 on their energy storage materials as they refined and optimized their thermal processing regime. That work culminated in a key piece of equipment to enable their production scale operations for pyrolysis of activated carbon for ultra capacitors. EnerG2, based in Seattle, WA, USA, is focused exclusively on the development and production of advanced carbons for energy storage devices.



Harper's innovative furnace design enables EnerG2's unique requirement of producing very high purity material at temperatures to 1100°C. Metallic impurities are unacceptable as they could affect charge storage ability. The high temperatures and purity specifications necessitate exacting control of gas particle interactions. After process refinement sessions in our lab, Harper engineered the multi-line rotary system with specialty construction materials inclusive of a ceramic lined process area to meet the purity conditions, and balanced the need for a gas tight operation on the nitrogen atmosphere through its proprietary sealing technology.



The rotary system is now used at EnerG2's new facility in Oregon, the world's first dedicated to the commercial-scale production of synthetic high-performance carbon electrode material. The facility was made possible by a \$21.3 million Federal stimulus grant allocated by the US Department of Energy for makers of advanced automotive batteries and energy storage technologies.

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Nano-Engineered Powdered Metals

After process optimization and refinement at our Technology Center, Harper developed continuous Rotary Furnace for Allomet Corporation for the production of nano-engineered powdered metals.

The system is engineered to drive increased throughput of Allomet's material by many multiples over previous batch systems, significantly improving their operations via increased productivity, shorter delivery lead-times, and reduced production costs.



Allomet made their selection after several process evaluation sessions at Harper's Technology Research Center, where Harper's experts supported the fine tuning of their carburization process. The results yielded an optimized system design, and will provide an increase in output efficiency that supports Allomet's continuing production volume growth while minimizing new capital investment. Allomet recognized Harper's expertise in thermal process development across a range of material industries, and Harper's knowledge in this area was a key factor for its selection as a partner. The new Rotary furnace is designed to accommodate Allomet's use of argon, hydrogen and methane atmospheres, either in combination or singularly.

"As we looked to significantly increase production capacity to meet the growing global demand for our unique and extremely wear-resistant Tough Coated Hard Powders (TCHP), we recognized that careful consideration and understanding of our thermal processing steps was required," commented Allomet's President, John Keane. "Harper provided exceptional technical proficiency in this area, and then followed through with a tailored furnace that optimizes our process and delivers efficiencies in multiple areas."

Allomet Corporation has been at the forefront of the nano-engineered powdered metal industry for nearly a decade. Using its globally-patented high-technology processes and equipment, the company has successfully developed several grades of unique, high-value commercial materials known as TCHPs, which are an entirely new class of industrial powders with long sought-after extreme strength and wear-resistance performance characteristics. High value uses of TCHP include cutting tools, wire dies, and surface coatings created via thermal spray or laser cladding.

About Harper International

Harper is a global leader in complete thermal processing solutions and technical services essential for the production of advanced materials. From concept to commercialization, from research scale to full production line operations, Harper is perpetually on the cutting edge. For decades, we have pioneered some of the world's most innovative, customized systems, with a focus on processing materials at high temperatures and in non-ambient atmospheres. For more info, visit harperintl.com or email info@harperintl.com

