Industry Updates

Bodycote Receives SBTi Approval for Emissions Targets Initiative

Bodycote, Macclesfield, U.K., has announced that its near-term science-based emissions target has been approved by the Science Based Targets initiative (SBTi). SBTi is an independent global body enabling businesses to set and validate emissions reduction targets in line with the latest climate science and strict criteria.

The initiative is a collaboration between CDP, the United Nations Global Compact, World Resources Institute and the World Wide Fund for Nature and one of the We Mean Business Coalition commitments. Science-based targets provide a clearly-defined pathway for companies with ambitious climate goals to reduce greenhouse gas emissions, helping prevent the worst impacts of climate change and future-proofing business growth. Targets are considered ‘science based’ if they are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement—limiting global warming to well-below 2 °C above pre-industrial levels and pursuing efforts to limit warming to 1.5 °C.

Bodycote, with over 165 facilities in 22 countries, commits to reduce its absolute scopes 1 and 2 greenhouse gas emissions by 28% by 2030 from a 2019 base. Scope 1 includes all emissions directly linked and emitted by Bodycote facilities and Scope 2 includes all emissions linked to the Group’s purchased inputs, those associated with the purchase of electricity, steam, or cooling. Bodycote measures Scope 3 emissions, in line with the SBTi guidelines, but does not report them as SBTi deems the quantum to be immaterial.

For more information: http://www.bodycote.com/

Exponent Team Receives DOE Funds to Advance EV Battery Technology

The DOE awarded $42 million in funding for 12 projects developing next-generation electric vehicle battery technologies to Exponent, Inc., Menlo Park, California, along with colleagues from the National Renewable Energy Laboratory (NREL) and the University of Texas, Austin. Project funding comes from the Department of Energy’s Electric Vehicles for American Low-Carbon Living (EVs4ALL) program.

“Exponent has been a leader in evaluating battery performance, risk, and safety for our clients for over 20 years,” said Ryan Spray, Ph.D., principal scientist at Exponent. “We look forward to the opportunity, with NREL and UT, to apply our deep expertise toward evaluating the energy storage technologies of tomorrow to enable new transportation possibilities.”

Deploying “clean” (zero emission) EVs is key to global decarbonization efforts. In the U.S., for instance, EVs4ALL reports that 80% adoption of EVs could reduce overall CO₂ emissions by 800 million tons per year. However, the widespread adoption of EVs depends on developing more durable, faster-charging battery technologies that are effective at low temperatures.

Exponent’s team will focus on characterizing the risks posed by next-generation cells from fundamental reaction-kinetics of the materials all the way to the battery pack level. The project will lead the charge by investigating failure modes and effects, revising testing standards, and new capabilities and tools to help derisk adoption of next-generation cells for commercial applications.

For more information: www.exponent.com
Fisher Barton Expands and Builds the Turning Center of Excellence

Fisher Barton, Waukesha, Wisconsin, has selected MSI General Corp. for the design and construction of its new industrial building and site development for Accurate Specialties’ Turning Center of Excellence.

Accurate Specialties Inc. (ASI), a division of Fisher Barton, is North America’s leading manufacturer of bronze gear blanks for power transmission and agricultural applications. With innovative and integrated manufacturing techniques, they specialize in precision machining, chill casting, centrifugal casting, and spun-cast gear blanks. As a full-service bronze foundry with automated machining capabilities, ASI delivers complete, fully machined, ready-to-hob bronze gear blanks and shafts made to exact customer specifications.

Scott Hoffman, CEO of Fisher Barton states, “We are expanding our capacity with this high-speed, fully automated 56,000 sq ft facility adjacent to our Accurate Specialties division to offer our customers additional manufacturing capabilities for close tolerance components, shafts, and bearings that compliment Fisher Barton’s already robust offering.”

For more information: www.fisherbarton.com

JEOL Introduces New FIB-SEM for Fast, Atomic Resolution STEM Sample Preparation

JEOL, Peabody, Massachusetts, developed a new focused ion beam (FIB) solution for preparing specimens prior to observing them in the transmission electron microscope (TEM). The new JIB-PS500i is a multipurpose FIB-SEM that delivers the synergy of fast sample preparation, SEM imaging and EDS analysis in a single instrument.

The new FIB sample stage offers fast transitioning between processing and imaging, allowing for real-time feedback of specimen quality. With the ability to prepare samples thinner than 30 nm, the FIB-SEM produces a sample suitable for superior atomic resolution imaging and analysis with a scanning transmission electron microscope (STEM). A retractable STEM detector enables easy acquisition of bright field and dark field images during processing to precisely evaluate preparation of the TEM sample. The operator can easily prepare TEM specimens using the STEMLING2 automatic TEM specimen preparation system, which allows unattended preparation of multiple samples.

A specially designed double-tilt sample holder, TEM-Linkage, enables seamless transfer from the FIB-SEM directly to the TEM.

A key advantage of the JIB-PS500i FIB is the large specimen chamber with an easy-access door. This design supports an efficient workflow and flexibility for a variety of samples and processes. The 5-axis full-eucentric large motor stage is designed to transport both large and multiple samples in the XY direction, and at a wide stage tilt and rotation range.

A new high current (up to 100 nA) FIB column is especially effective for large-area processing and analysis, which is ideal for semiconductor samples. The new FIB has high performance fine...
milling capabilities essential for quality lamella preparation imaging, EDS analysis, and 3D microscopy. The new JIB-PS500i has superior performance in the low kV range, as low as 0.5 kV, essential for beam sensitive materials.

For more information: www.jeolusa.com

Mississippi State University and Army Division Partner to Boost AI-driven Defense Tech

Mississippi State University (MSU) is leveraging its expertise in high-performance computing and advanced manufacturing to support next-generation defense capabilities through a partnership with one of the world’s premier engineering and research centers.

An interdisciplinary team of Mississippi State researchers, led by the university’s Center for Advanced Vehicular Systems, is partnering with the Vicksburg-based U.S. Army Engineer Research and Development Center on new projects to support artificial intelligence-driven defense manufacturing and predictive maintenance. Photo by Megan Bean.

The university recently was awarded three separate contracts totaling $8 million from the Vicksburg-based U.S. Army Engineer Research and Development Center (ERDC) with a focus on data analytics and visualization systems, additive manufacturing, and artificial intelligence-driven predictive maintenance.

The first project, titled “Data Analytics and Visualization System Infrastructure,” will result in an end-to-end framework to address the growing need for a robust infrastructure for data analysis and visualization to support DOD computational science and engineering methods.

The second proposal, “Advanced and Additive Manufacturing,” leverages MSU’s high-performance computing capabilities to develop a system of testing and evaluating part quality in the additive manufacturing cycle.

The third proposal, “Advanced Maintenance,” studies advanced manufacturing equipment performance and how AI can predict and improve product performance and reliability.

MSU and ERDC have collaborated on dozens of research projects in areas of mutual expertise and capability such as high-performance computing, materials science, military engineering, autonomous systems, cybersecurity, artificial intelligence, and machine learning, among others.

Last fall, MSU expanded its presence in Vicksburg to provide local entrepreneurship support and enhance technology transfer efforts and research collaborations with ERDC and other federal partners. Additionally, ERDC is among the largest employers of MSU engineering graduates.

For more information: www.erdc.usace.army.mil

Teams Forge Forward in NASA Moon Metal Production Challenge

Seven university teams were selected to develop concepts supporting metal production on the Moon in NASA’s 2023 annual Breakthrough, Innovative and Game-Changing (BIG) Idea Challenge: Lunar Forge.

NASA’s 2023 annual Breakthrough, Innovative and Game-Changing (BIG) Idea Challenge asks university students to design a metal production pipeline on the Moon—from extracting metal from lunar minerals to creating structures and tools. Credits: NASA/Advanced Concepts Lab.

The challenge is a unique collaboration between NASA’s Space Technology Mission Directorate’s Game Changing Development program and NASA’s Office of STEM Engagement Space Grant Project.

In situ resource utilization—or the ability to use naturally existing resources—is fundamental to a steady cadence of Artemis missions and a sustained human presence on the Moon and a lunar economy. Metal’s strength and resistance to corrosion make it key to building structures needed for a lunar base, such as pipes, cables, landing pads, transport rails, and pressure vessels to contain volatiles like fuel. However, the metal materials for infrastructure are heavy, making them challenging and costly to transport from Earth.

“The BIG Idea Challenge expands opportunities for students and faculty to immerse themselves in real NASA projects, as well as supports student pursuits in STEM,” said NASA’s Space Grant Project Manager Tomas Gonzalez-Torres.
Once funded, teams continue designing, building, and testing their concepts in advance of a November 2023 forum, where their work will be showcased to the public and judged by a panel of NASA and industry experts. The forum allows the university-led teams to interface with ongoing lunar mission planning discussions that are underway within STMD’s Lunar Surface Innovation Initiative (LSII). Once developed, these projects are incubated by universities and could augment technology currently in development by NASA.

For more information: bigidea.nianet.org/2023-challenge.

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