

Manufacturing Demonstration Facility

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Next-Generation Manufacturing

As the nation's premier research laboratory, Oak Ridge National Laboratory is one of the world's most capable resources for transforming the next generation of scientific discovery into solutions for rebuilding and revitalizing America's manufacturing industries. These industries call upon ORNL's expertise in materials synthesis, characterization, and process technology to reduce risk and accelerate the development and deployment of innovative energy-efficient manufacturing processes and materials targeting products of the future.

The Department of Energy's first Manufacturing Demonstration Facility (MDF), established at ORNL, helps industry adopt new manufacturing technologies to reduce life-cycle energy and greenhouse gas emissions, lower production cost, and create new products and opportunities for high-paying jobs.

Collaborating with Industry

Under the MDF **Technology Collaborations Program**, industry can leverage world-leading capabilities and expertise in short-term collaborative projects on the path to commercial implementation of advanced manufacturing and materials technologies. In all cases the objective is to strengthen the domestic manufacturing enterprise by driving innovation and accelerating adoption of clean energy manufacturing technologies leading to increased domestic production capacity, jobs for American workers and regional economic development.

Technology Areas

- **Additive Manufacturing** utilizing a broad range of direct manufacturing technologies, including electron beam melting, ultrasonic, extrusion, and laser metal deposition for unlimited design flexibility and rapid prototyping
- **Composites and Carbon Fiber** advancing a broad range of carbon fiber synthesis, characterization, and compositing technologies from precursor evaluation through carbon fiber pilot scale production (25 metric tons/year) for low cost, lightweight, and higher-performance carbon fiber
- **Roll-to-Roll Processing** developing low-cost manufacturing of flexible electronics, photovoltaics, and energy storage systems using pulse thermal processing and other advanced processing technologies
- **Lightweight Metals Processing** using advanced synthesis and processing technologies for low-cost titanium alloys, magnesium alloys, and metal matrix composite products
- **Magnetic Field Processing** for dramatic enhancement of material properties beyond today's limits, including increased fatigue life and strength and stress relief
- **Low-Temperature Materials Synthesis** for lower energy and processing costs through biosynthesis of unique materials at low temperature
- **Batteries Manufacturing** for innovative processing using ORNL's unique prototyping materials and evaluation facility

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