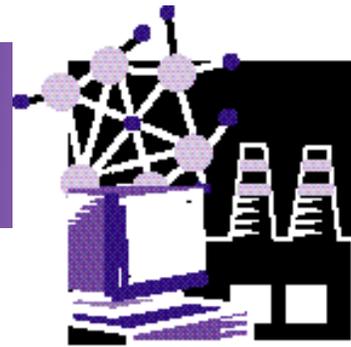


# Advanced Industrial Materials Program

## Project Fact Sheet



## METALS-PROCESSING LABORATORY USERS (MPLUS) FACILITY

### BENEFITS

- Estimates of energy benefits up to 12 trillion Btu
- Increased energy efficiency of metals processing
- Higher process efficiencies and increased component lifetime
- Improved waste minimization

### APPLICATIONS

- Aluminum—cast aluminum alloys with improved mechanical properties
- Chemicals—nickel-based alloy R&D for chemical process equipment
- Metal casting—improved understanding of semisolid flow and thin-wall casting
- Steel—energy efficient heating, optimization of heat treatment transformations, optimized die steels
- Glass—alternative heating and melting methods, and corrosion-resistant alloys
- Forest products—refractories for black liquor processes, corrosion and minimization of digester materials
- Crosscutting industries and programs—heat-treating, welding alloy development, and alloy structure properties and relationships
- National programs—evaluation of processing effects on turbine alloys

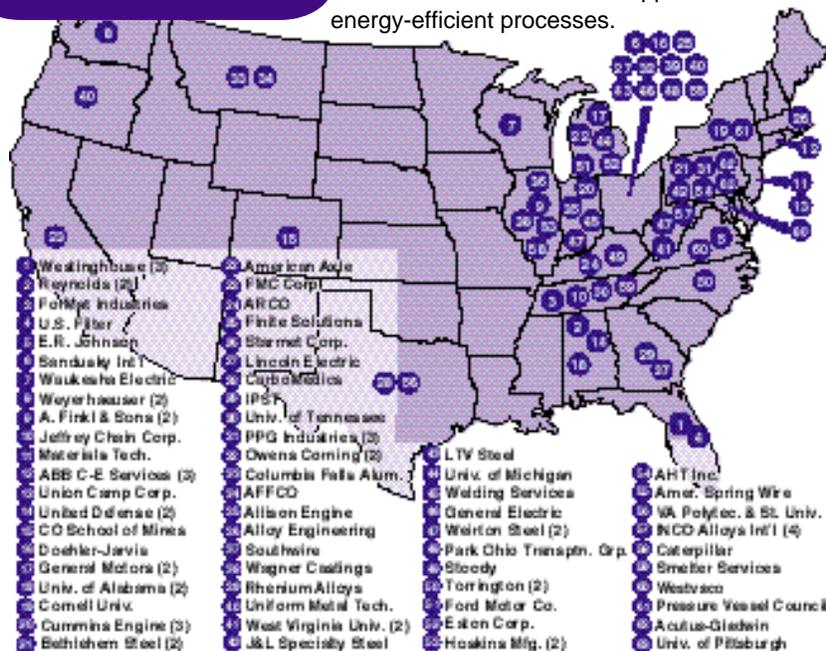


## MPLUS IMPACTS THE ENERGY EFFICIENCY OF IOF INDUSTRIES, CROSSCUTTING, AND NATIONAL PROGRAM INDUSTRIES

The Metals-Processing Laboratory Users (MPLUS) Facility is an officially designated DOE user facility. MPLUS partners with U.S. industries and academia by enabling access to specialized DOE national laboratory capabilities, leading to improved energy efficiency, environmental benefits, and U.S. competitiveness by addressing materials-related issues. The facility is focused on supporting OIT activities, including the Industries of the Future, Crosscutting, and National programs. Needs are met by focusing primarily on metals-related needs, other materials issues, and on more energy-efficient materials-process relationships. Energy improvements, for example, are made by the development of improved higher-temperature alloys, leading to higher thermal efficiencies. More corrosion-resistant-alloy and improved-materials processes lead to improved environmental benefits. Efforts include modifications of alloy compositions, development of new and more-advanced alloys, materials/process-related issues, development of alternate materials processes, and materials/user application needs. MPLUS enables interactions among industry, academia, and national laboratories, addressing

materials and materials-processing needs, leading to more-efficient materials applications and energy-efficient processes.

### COMPANIES THAT HAVE REQUESTED MPLUS



More than 85 user proposals by 63 companies and universities from 25 states have been received into MPLUS in the last two years.

## Project Description

**Goal:** The goal of the M<sub>PLUS</sub> facility is to assist U.S. industries and academia in improving energy efficiency, environmental benefits, and U.S. competitiveness by focusing on materials-related issues. M<sub>PLUS</sub> is an officially designated DOE user facility. It supports OIT-related activities, including the Industries of the Future, Crosscutting, and National programs. The facility provides access to specialized capabilities and expertise needed to solve primarily metals-based issues. M<sub>PLUS</sub> is also integrated with other user facilities in order to provide the best approach to finding solutions. M<sub>PLUS</sub> has four user facilities including (1) metals processing (melting, thermomechanical processing, casting, solidification, forging, heat treating); (2) joining (weld metal solidification, advanced welding processes, brazing, weld modeling); (3) characterization and properties (nondestructive evaluation, residual stress measurements, high temperature mechanical properties, fracture toughness, corrosion, microstructural evaluation); and (4) process modeling (high-performance, massively parallel computing, microstructural modeling, deformation modeling, and process modeling). Projects with industry and academia crosscut all of the "Industries of the Future" and national programs.

## Progress and Milestones

- In the last two years as a DOE OIT designated user facility, M<sub>PLUS</sub> has received more than 85 proposals by 65 companies from 25 states for joint projects
- Projects include those related to each of the IOF industries, crosscutting programs, and national programs
- Procedures and mechanisms were developed to make M<sub>PLUS</sub> responsive to industry and academia in accessing and utilizing the capabilities of a national laboratory



### PROJECT PARTNERS

Oak Ridge National  
Laboratory  
Oak Ridge, TN

Industries and  
Universities:  
please see list in figure

### FOR ADDITIONAL INFORMATION, PLEASE CONTACT

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