

ABOUT MPC

The Materials Preparation Center prepares, purifies, fabricates and characterizes research-sized quantities of specialized metals, intermetallic alloys and ceramics. MPC is a unit of Ames Laboratory, a U.S. Department of Energy research laboratory operated by Iowa State University. MPC and Ames Laboratory are members of ISU's Institute for Physical Research and Technology.

MPC was established in 1981 to give scientists at university, industry and government laboratories access to novel materials and new technologies as they are developed. Each year, MPC satisfies hundreds of requests for customized materials and services not available from commercial sources.

WHAT MPC DOES

Materials Preparation

MPC's activities are built on the internationally recognized achievements of Ames Laboratory scientists who work with very pure rare-earth, alkaline-earth and refractory metals. MPC prepares research-quality, pure metals and alloys in single and polycrystalline forms. The center also develops processing techniques required for special preparations of rare-earth, alkaline-earth, refractory and transition metals.

MPC transfers new knowledge about materials-processing equipment and techniques through on-site training for client representatives.

Advanced Materials Processing

Two areas of emphasis in MPC's Advanced Materials Processing Section are powder processing and plasma arc spray coating. In processing powders, MPC uses high-pressure gas atomization to produce ultrafine metal and alloy powder. Because the atomized powders solidify rapidly, their microstructures have nearly ideal strength, toughness, corrosion resistance and magnetic properties.



Czochozalski method single crystal growth furnace (inset: Bridgman crucibles, for single crystal growth)



melt spinner for studying rapid solidification

The Ames Lab Plasma Spray Facility uses these ultrafine powders to make metal and ceramic coatings that provide improved wear or corrosion resistance, thermal and electrical insulation and oxidation protection. Recent work includes developing quasicrystalline coatings and their applications.

Analytical Services

MPC's Analytical Group develops techniques that have broad capabilities and are useful for completely characterizing specialized materials. Among the center's analytical capabilities are solution analysis, instrumental techniques and laser mass spectrometry.

Materials Referral System & Hotline

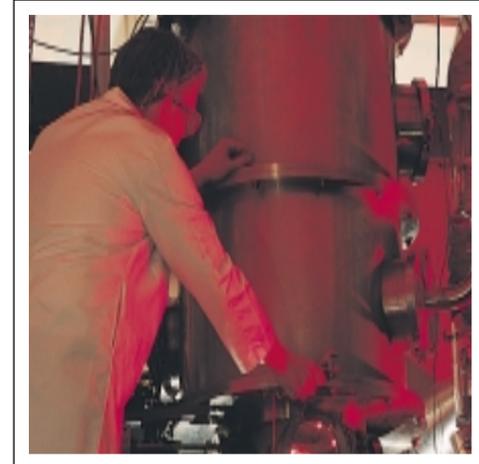
MRSH maintains a computer database of materials suppliers and producers that enables its staff to find sources of research- and specialty-grade chemicals, metals and alloys. MRSH specializes in finding sources for materials in single-crystalline form, but will also attempt to locate other types of materials. The service is free and is supported by DOE's Office of Basic Energy Sciences.

Iowa Companies Assistance Program

The Iowa Companies Assistance Program promotes interactions between Iowa industries and the MPC. Through ICAP, manufacturers can receive short-term, no-cost technical assistance with materials-related problems. On-site metallurgists handle many of the technical problems, but they also draw on scientific expertise across ISU.

WHO WE SERVE

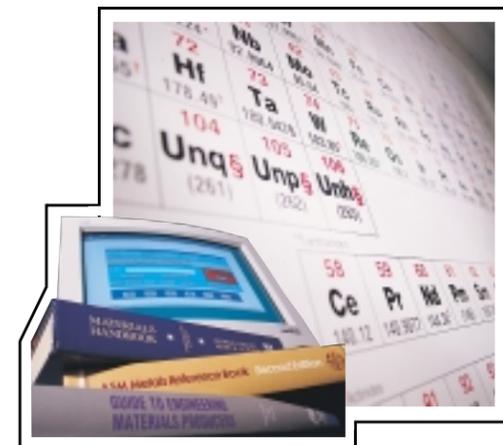
MPC's services are available to both the research community and private industry throughout the world on a cost-recovery basis. MPC exercises prudent confidentiality practices in all transactions. Formal nondisclosure agreements are arranged upon request.



high-pressure gas atomization chamber



Auger electron spectroscopy microscope



MRSH resources

FOR MORE INFORMATION, PLEASE CONTACT:

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MPC is a member of the Institute for Physical Research and Technology, a network of research and technology-transfer centers and industrial-outreach programs at Iowa State University.

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Cover photo: Types of materials that are available through the Materials Preparation Center: single crystals; high purity rare-earth metal and fluoride, high purity refractory and alkaline-earth metals; gas atomized metal powders as well as induction and arc cast ingots, swaged, and wire drawn research alloys.

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Institute for Physical Research and Technology



Materials
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Center*

* A unit of the Ames Laboratory
of the U.S. Department of Energy