



Materials Science Research Rack (MSRR)

The Materials Science Research Rack, or MSRR, will allow for study of a variety of materials—including metals, ceramics, semiconductor crystals and glasses onboard the International Space Station. It is scheduled to fly aboard space shuttle Atlantis on STS-128, planned for launch in August 2009. Upon arrival at the space station the research rack will be housed in the U. S. Destiny Laboratory Module.

Materials science is an integral part of development of new materials for everyday life here on Earth. The goal of studying materials processing in space is to develop a better understanding of the chemical and physical mechanisms involved. Materials science research benefits from the microgravity environment of space, where the researcher can better isolate chemical and thermal properties of materials from the effects of gravity. With this knowledge,

reliable predictions can be made about the conditions required on Earth to achieve improved materials.

The Materials Science Research Rack is a highly automated facility containing two furnace inserts in which sample cartridges will be processed up to temperatures of 2500° degrees F. Initially, 13 sample cartridge assemblies will be processed, with each cartridge assembly containing experiment samples. The cartridges are placed inside, one at a time, the furnace insert for processing. Once a cartridge is in place the experiment can be run by automatic command or science conducted via telemetry commands from the ground. Processed samples will be returned to Earth as soon as possible for evaluation and comparison of their properties to samples similarly processed on the ground.

The materials science rack is about the size of a large refrigerator, measuring 6 feet high, 3.5 feet wide and 40 inches deep and weighing about 1 ton. The development of the research rack was a cooperative effort between NASA's Marshall Space Flight Center and the European Space Agency (ESA).



Image of a complete flight rack. (NASA MSFC)

NASAfacts

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