

Rapid quench in an electrostatic levitator

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The Electrostatic Levitation (ESL) Laboratory at the NASA Marshall Space Flight Center (MSFC) is a unique facility for investigators studying high-temperature materials. The ESL laboratory's main chamber has been upgraded with the addition of a rapid quench system. This system allows samples to be dropped into a quench vessel that can be filled with a low melting point material, such as a gallium or indium alloy, as a quench medium. Thereby allowing rapid quenching of undercooled liquid metals. Up to eight quench vessels can be loaded into a wheel inside the chamber that is indexed with control software. The system has been tested successfully with samples of zirconium, iron-cobalt alloys, titanium-zirconium-nickel alloys, and a silicon-cobalt alloy. This new rapid quench system will allow materials science studies of undercooled materials and new materials development. In this presentation, the system is described and some initial results are presented.