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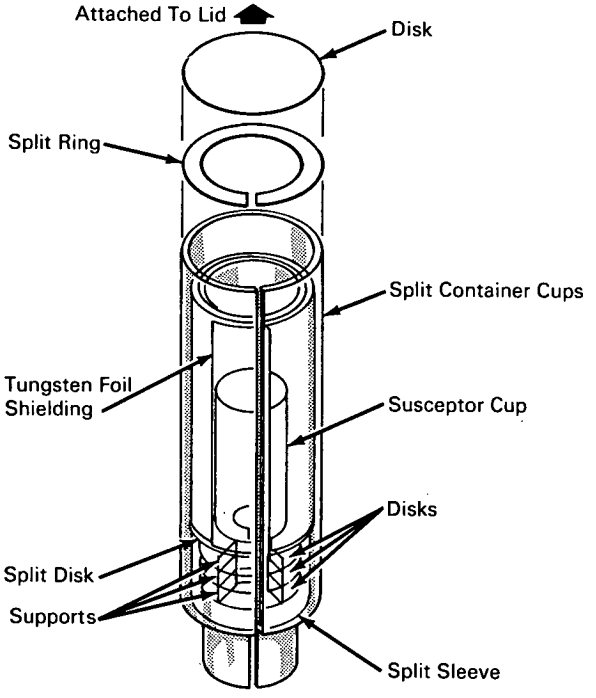
Brief 66-10538

NASA TECH BRIEF

Tungsten Insulated Susceptor Cup for High Temperature Induction Furnace Eliminates Contamination



The problem:

Conventional high temperatures (5000° to 6000°F) in induction furnaces require the use of special heat shielded (insulated) susceptor cups. At these high temperatures, reactions between various refractory materials are often destructive to the susceptor cups and produce undesirable contamination. When these reactions occur, considerable time is required to build a new cup assembly. The use of conventional cup assemblies requires various modifications depending on requirements for compatibility, melting, or heat treating runs.

The solution:

METILUR (Materials Experimental Tungsten Induction Laboratory Unit Replacement) is an improved, unitized design of a susceptor cup and shielding that uses only one type of construction material (tungsten) which eliminates contamination. The unit shown consists of the susceptor cup, side and bottom shielding, and support containers. Top shields (usually mounted to the access lid) are positioned after specimens are placed in the susceptor cup, which has previously been lowered inside the work coil of the induction furnace.

(continued overleaf)

How it's done:

The METILUR's are easy to install or remove from the furnace. It is possible to get back into operation within an hour after an accidental melt or reaction from the specimens. The design is easy to standardize, and a unit can be borrowed from another chamber, or spares kept for quick replacement. There are no hot spots or serious arcing conditions that would call for an immediate shutdown.

Notes:

1. Cycling runs can be accomplished with METILUR. With the power settings preset, the "on" button is pressed and in one minute the specimen is vented to 4730°F. After 10 minutes the power is shut off and the unit is rapidly cooled to 400° F. Twenty-five cycles of this type of testing have been accomplished in two days of operation.
2. The inner parts of the METILUR can be reduced in number or thickness to make more room for large susceptor cups and billets. METILUR can be used with either a susceptor cup or a billet. The perforated tungsten foil shielding can be placed around the billet or susceptor cup without the split cup assembly.
3. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Lewis Research Center
   21000 Brookpark Road
   Cleveland, Ohio 44135
   Reference: B66-10538

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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