Crucible melting a variety of materials in a nitrogen atmosphere

Objective
Heat to melting point various materials in a nitrogen atmosphere in a graphite or molybdenum crucible.

Material
Magnesium fluoride, tantalum pentoxide, aluminum, yttrium fluoride, germanium, hafnium or titanium dioxide and a Pyrex bell jar

Temperature
Melting temperatures varies

Frequency
160 kHz

Equipment
- Ambrell 10 kW induction heating system, equipped with a remote workhead containing two 1.0µF capacitors for a total of 0.5 µF
- An induction heating coil designed and developed specifically for this application.

Process
The crucible is heated using a coil with a four turn pancake at the base that extends upward into a three turn helical coil. Times and melting temperatures vary due to the properties of the different materials.

Results/Benefits
Induction heating provides:
- Faster process time than electron beam heating.
- Repeatable, consistent results.
- Even distribution of heating.
Side and top view of custom coil

Various materials in the crucibles

Heating of crucible under Pyrex jar with the nitrogen flowing in from underneath

Various materials in the crucibles