

# Advanced Energy Materials Laboratories

## Oxygen Free Synthesis Techniques

### Double Glove Box



Working Under Inert Gas Atmosphere

### Vacuum Line



Evacuating Of Sample Vessels

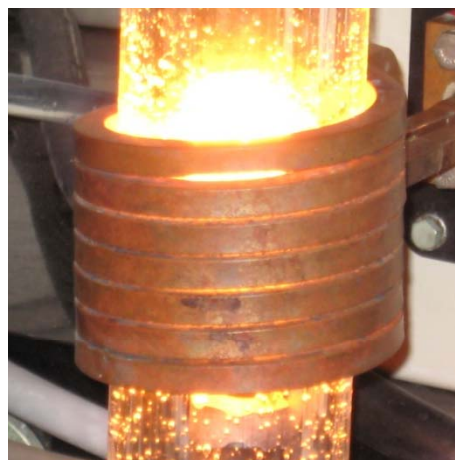
# High Temperature Synthesis Techniques

## Arc Furnace



Fast Melting  $> 2000^{\circ}\text{C}$  For A Few Seconds

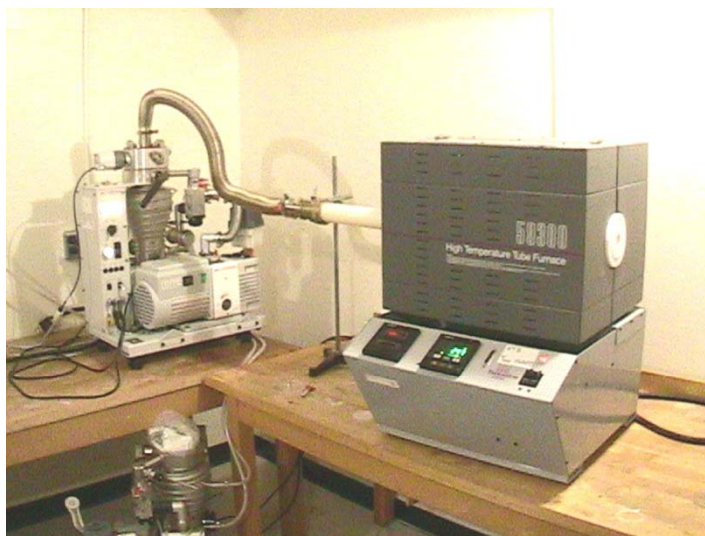
## Induction Furnace



Controlled Annealing Between  $900^{\circ}\text{C}$  And  $2000^{\circ}\text{C}$  For Some Hours

# High Temperature Synthesis Techniques

## High Temperature Resistance Furnace



Controlled Annealing Below 1700°C For Days Or Weeks

## Resistance Furnaces



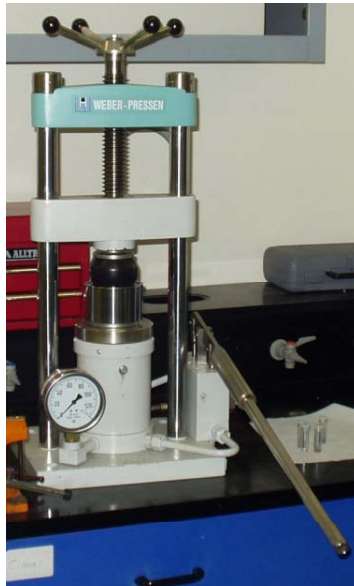
Controlled Annealing Below 1100°C For Days Or Weeks



# Consolidation Techniques



Controlled Pressing With 30 Tons Below 1600°C For Hours



Controlled Pressing At Room Temperature For Hours

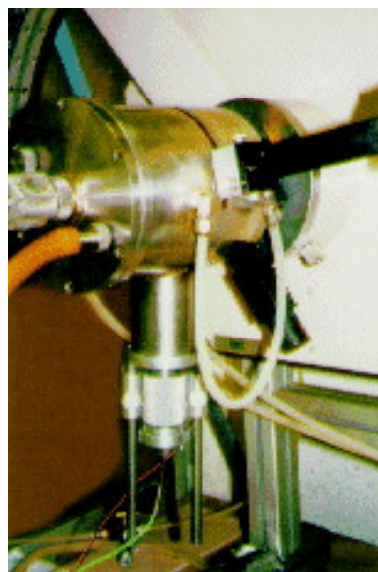
# Analysis

## Optical Microscope



Visual Control And Selection

## Powder Diffractometer With Furnace (inel)



Collection Of Powder Diffraction Data For Phase Analysis

# Analysis

Departmental:  
Single Crystal Diffractometer (Bruker AXS)



Collection Of Single Crystal Diffraction Data  
For Crystal Structure Determination

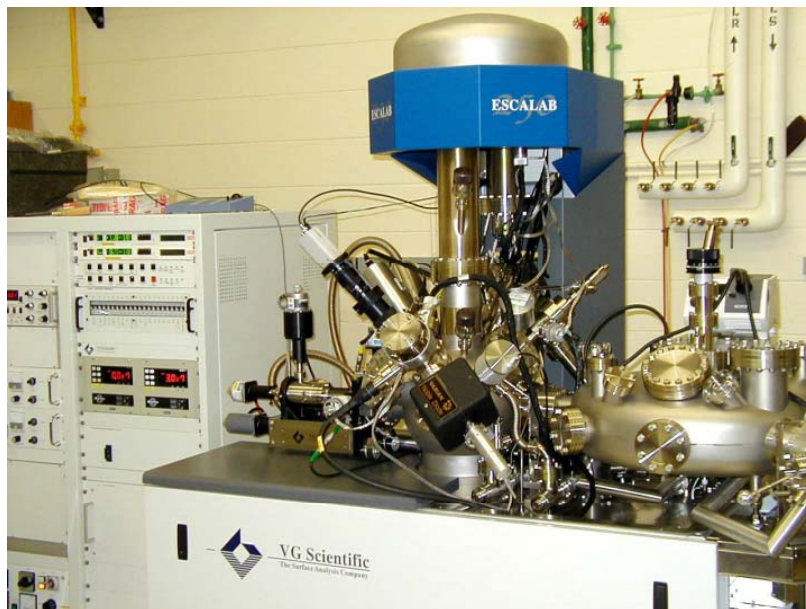
# Analysis

WATlabs:

Scanning Electron Microscope (LEO) With EDX



Imaging ESCA Microprobe System (VG)





# Physical Property Measurements

## Simultaneous Seebeck and Electrical Conductivity Measurements (ULVAC)



Measurements Between 25°C And 1000°C

## Thermal Conductivity Measurements (Anter)



Determining Thermal Conductivity Between 25°C And 1000°C



# Physical Property Measurements

## Thermal Analysis (Netzsch)



Determining DSC And TG Between 25°C And 1500°C

## Seebeck Measurements (MMR)



Determining Seebeck Coefficient Between 25°C And 300°C