

Contact person: Lect.dr. Roxana Dudric (roxana.pacurariu@phys.ubbcluj.ro)

SAMPLE PREPARATION LABORATORY

A large percentage of the materials that we study are made in our own laboratories. We prepare polycrystalline bulk and nanocrystalline samples of a variety of classes of materials including intermetallic and oxides systems.

Several types of system are available for the preparation of samples in our laboratory, including argon arc melting and levitation method sample preparation equipment, a high energy ball milling equipment for mechanical alloying, gloves and controlled atmosphere box, and a range of standard furnaces, some with controlled atmospheres.



The main equipment:

1. arc melting equipment for sample preparation

Melting process used for synthesis of intermetallic compounds at high temperatures (up to 3500°C) in inert gas atmosphere. It applies an arc discharge between a tungsten rod cathode and the metal sample placed on a copper crucible.



2. levitation method sample preparation equipment



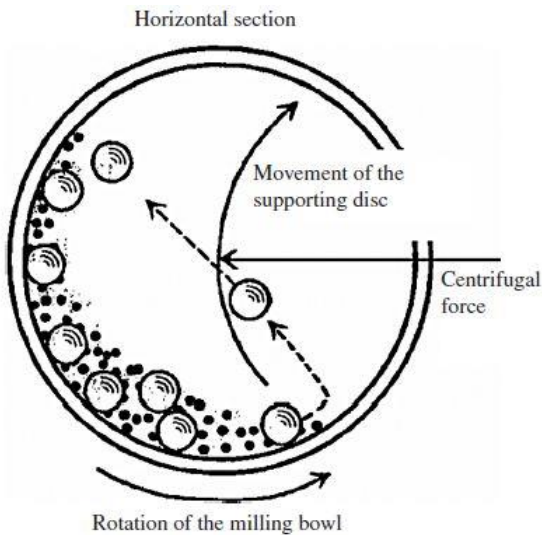
Induction heating is simply a method of transferring heat energy. A high voltage electrical source from a primary coil induces a low voltage, high current in the metal, or secondary coil. When the charge material is

molten, the interaction of the magnetic field and the electrical currents flowing in the induction coil produce a stirring action within the molten metal. The degree of stirring action is influenced by the power and frequency applied as well as the size and shape of the coil and the density and viscosity of the molten metal.

3. Vario – Planetary Mill – Fritsch high energy ball milling equipment for mechanical alloying



- a. Flexible configurable grinding conditions: impact and/or friction
- b. Ideal for mechanical alloying and activating
- c. Fast grinding with rotational speeds up to 400 rpm
- d. Loss-free grinding even below 1 μm
- e. 440C hardened steel balls and milling vial.



Mechanical milling has been recognized as an effective way of occurrence the solid state chemical reaction at low temperature. The powder mixture placed in the ball mill is subjected to high-energy collision from the balls. The chemical composition of the precursors changes as a result of mechanically induced solid state reaction.

4. Gloves and controlled atmosphere box

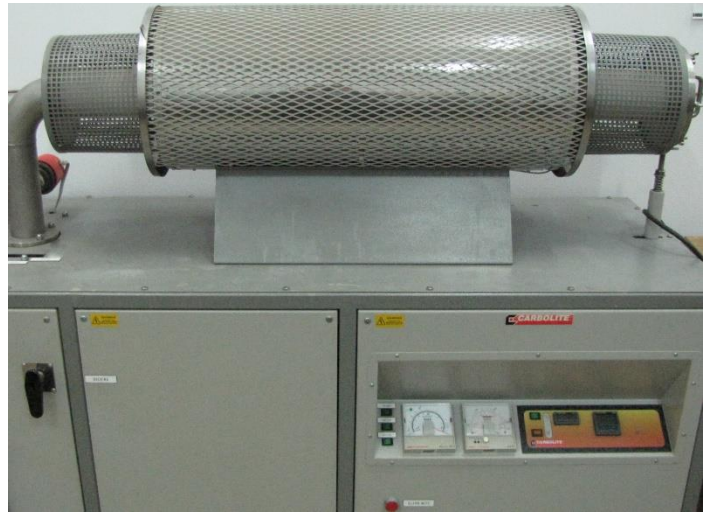


5. heat treatment equipment

Tube furnaces for heat treatments:

- a. in vacuum, free or in controlled atmosphere (O_2 , N_2 , Ar)
- b. temperatures up to $1200^{\circ}C$
- c. 65 mm, 75 mm or 100 mm work tube inner diameters
- d. 450, 550, 700, 850 or 900 mm heated length

e. Integral wirewound work tube



6. Manual hydraulic press and evacuable pellet die in sizes suited for the preparation of solid pellets from powders



Atlas™ Manual Hydraulic Press

100 MPa

safety guards

upper bolster

pressure control valve

release valve

- Loads up to
- Polycarbonate
- Adjustable
- Adjustable
- Vacuum Ports
- Pressure



Atlas Series Evacuatable Pellet Dies

producing high-quality pellets

- Ideal for

- Evacuatable for sample pellet clarity and quality
- Hardened Stainless Steel for durability
- Highly Polished Pellets
- Wide range of sizes (from 5 mm to 40 mm diameter) and load capabilities

7. Other sample preparation equipment

