

1st Experiment

1. **Name of Experiment:** Preparing a Metal Specimen for Microscopic Examination.

2. **The Objective of the Experiment:**

- a. The determination of the size and shape of the grains.
- b. To specify what phases are present.
- c. To find if the specimen has undergone plastic or elastic deformation.
- d. To search for impurities.
- e. To find if it has undergone any phase changes.

3. **Devices Used for Experiment:**

- A. Microscope
- B. Steel Specimens
- C. Hot Mounting Device
- D. Grinding Device
- E. Polishing Device
- F. Hot Air Dryer
- G. Etching Solution for steel

4. **Experimental Work**

First we choose a specimen of suitable dimensions or cut a specimen to our requirements taking care not to raise its temperature. We then hot mount it and start the grinding process taking care to rinsing it with water when changing from one grade of grinding to another(there are four grade starting from the roughest & gradually moving smoother one).

Using a polishing device which is a disk covered with billiard or buffer cloth diamond paste is spread and the polishing starts whilst constantly moving the specimen In an (8) shape over the polishing wheel. When we obtain a mirror like surface the specimen is then washed swapped gently with an etchant (Netal :98% alcohol + 2% HNO_3) just for a few seconds after which it is quickly rinsed with water and

5. **Discussion :**

- a. Define by what is meant by metallography

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- b. What is the difference between metallography and metallurgy?
- c. Why must we avoid an increase in temperature in the specimens.
- d. Why must we rotate the specimen 90° each time between polishing phases.
- e. How can we avoid the oxidation of the specimen's surface while treating it with etching solution?
- f. Explain how the etchant solution shows the grains and grain boundary
- g. Why are the grain boundaries oxidization more severe and are the 1st to be oxidized than the grain surface themselves?