

Microscopic investigation of a metallurgical mount

Embedding and polishing are common techniques used to create flat samples for microscopic investigation. Often the samples are embedded in a resin with a standard diameter of 1 inch. The Phenom™ offers a special metallurgical mount holder to support 1 ¼ inch (~32 mm) samples.

Introduction

The purpose of embedding is to protect fragile or coated materials during preparation and to obtain good edge retention. Embedding is also used to produce specimens of a uniform size, like minerals, clay or other particles and can also be used to section a material and investigate its interior.

Preparation

Mechanical preparation is the most common method for preparing materialographic/metallographic samples for microscopic examination. Abrasive particles are used in successively finer steps to remove material from the surface, until the required result is reached.

The preparation of materialographic/metallographic samples for examination by light microscopy or SEM for image analysis and hardness testing is often a specialist task. Increasingly, however, more fully automatic systems are available to make things easier. It can take a considerable time to section, grind, mount and polish a sample.

Grinding and Polishing

Grinding removes saw marks and levels and cleans the surface of the specimen. Polishing eliminates the artifacts of grinding but removes very little material. Grinding uses fixed abrasives – the abrasive particles are bonded to the paper or plates – for fast material removal. Polishing uses abrasive particles in a liquid which are suspended on a cloth.

In summary, cutting the sample will take up to 1 hour, depending on the hardness. The grinding and polishing step may take approximately 2 – 2 ½ hours.

For ordering information; contact your local Phenom™ sales representative (address can be found at the website).



Image 1. BSE Mode of β -processed Ti-6-4

PHENOM™



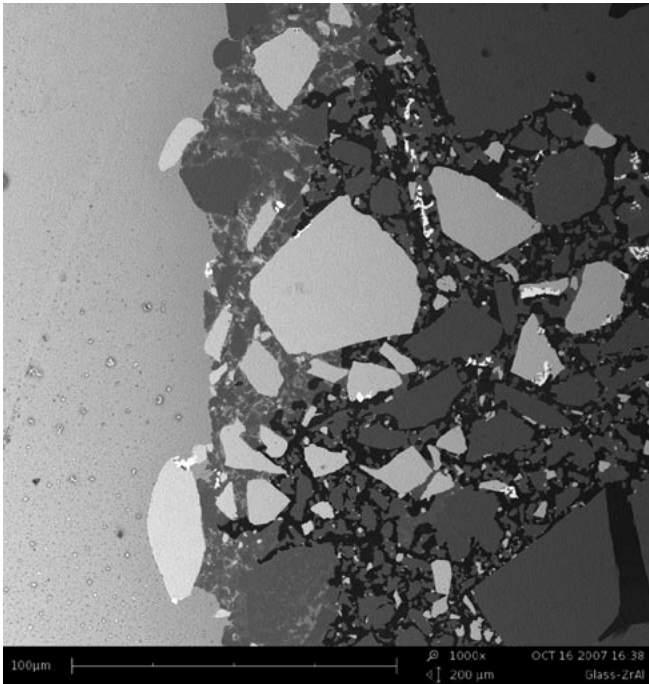


Fig 1. Image of a polished surface of Glass - left in the image - in contact with Glass Furnace construction material (ZAC) – right in the image. The image is taken at 1000x in compositional mode. Different phases will appear in the image with different grey levels.

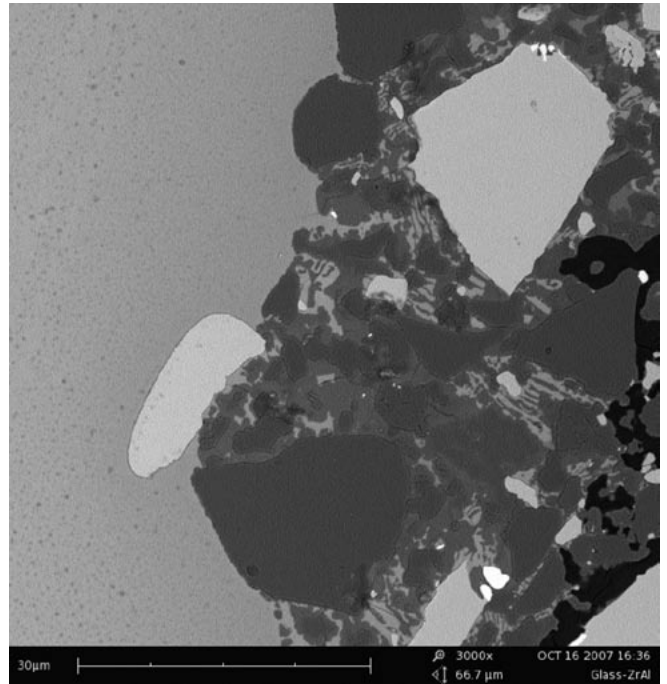


Fig 3. Glass – Furnace diffusion zone. The Zirconium (Zr) particles appear white in the image, the Aluminum (Al) granules are dark grey. The glass phase (on the left side) is diffusing into the granules.



Fig 2. Special holder to support the polished metallurgical mounts up to 1 ¼ inch.

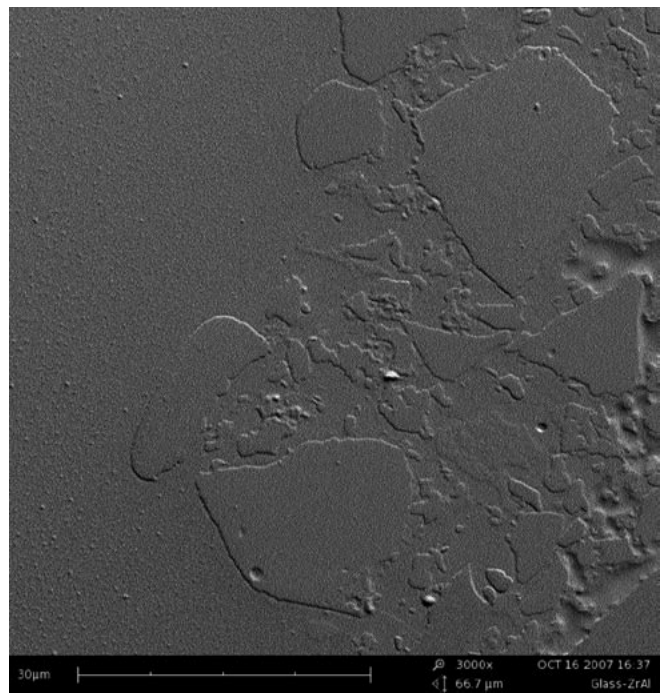


Fig 4. Image taken in topographical mode showing the difference in height between the phases after polishing.

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