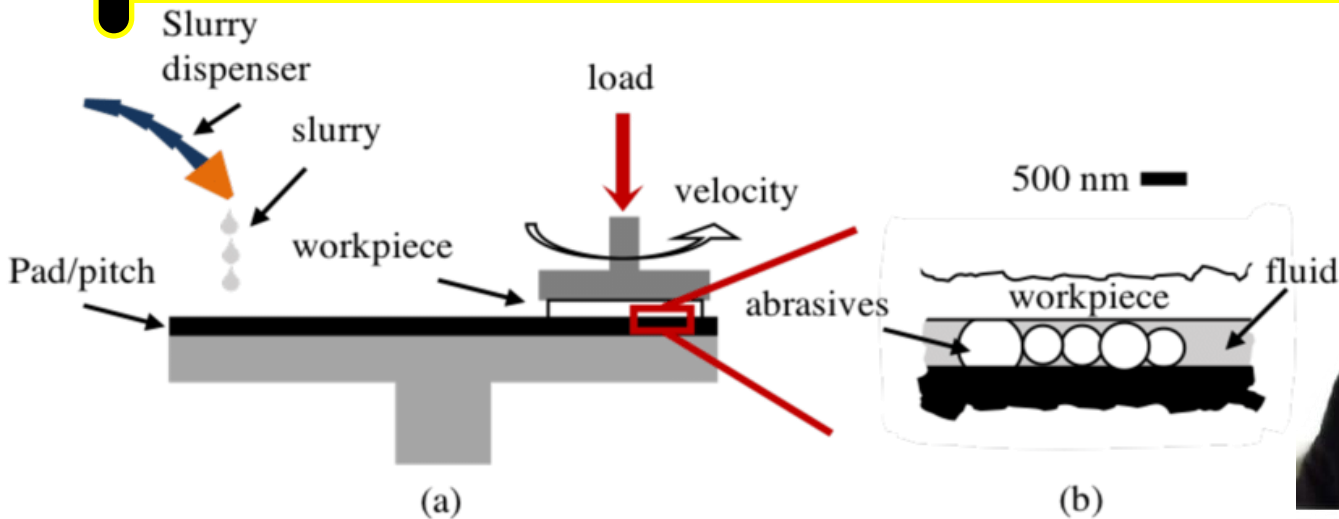




# AMIRAJ

## COLLEGE OF ENGINEERING & TECHNOLOGY

### Ch-6 Advance Super finishing Technology **POLISHING**



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# INTRODUCTION

- Polishing is the process of creating a smooth and shiny surface by rubbing it or using a chemical action, leaving a surface with a significant specular reflection.
- In some materials (such as metals, glasses, black or transparent stones) polishing is also able to reduce diffuse reflection to minimal values.

# INTRODUCTION

- When an unpolished surface is magnified thousands of times, it usually looks like mountains and valleys. By repeated abrasion, those "mountains" are worn down until they are flat or just small "hills." The process of polishing with abrasives starts with coarse ones and graduates to fine ones.

# MECHANICAL PROPERTIES OF POLISHED GOODS

- The strength of polished products is normally higher than their rougher counterpart owing to the removal of stress concentrations present in the rough surface.
- They take the form of corners and other defects which magnify the local stress beyond the inherent strength of the material.

# MECHANICAL PROPERTIES OF POLISHED GOODS

- Polishing with very fine abrasive differs physically from coarser abrasion, in that material is removed on a molecular level, so that the rate is correlated to the boiling point rather than to the melting point of the material being polished.

# TYPES OF POLISHING

- Metalworking
- Woodworking
- Chemical-mechanical polishing, which is used in semiconductor fabrication.

# TYPES OF POLISHES

- Flame polishing, a type of polishing used on glass and thermoplastics.
- Ultra-fine, abrasive paste polishing, polishing for soft or fragile work surfaces.
- Vapor polishing, a method of polishing plastics to optical clarity

# METALWORKING

- Polishing is a finishing process for smoothing a workpiece's surface using an abrasive and a work wheel or a leather strop.
- Polishing is a more aggressive process which leads to a smoother, brighter finish.
- The removal of oxidization (tarnish) from metal objects is accomplished using a metal polish or tarnish remover; this is also called polishing.



# METALWORKING

- To prevent further unwanted oxidization, polished metal surfaces may be coated with wax, oil, or lacquer. This is of particular concern for copper alloy products such as brass and bronze.
- The condition of the "metal" at hand determines what type of abrasive will be applied. The first stage, if the material is unfinished, starts with a rough abrasive and each subsequent stage uses a finer abrasive, until the desired finish is achieved.

# METALWORKING

- To achieve a Mirror it requires polishing and buffing compounds, polishing wheels and high speed polishing machines or other machine tools that can be used for polishing, like an electrical drill. Lubricants like wax and kerosene may be used as lubricating and cooling media during these operations, although some polishing materials are specifically designed to be used "dry."

# METALWORKING

- Wood finishing refers to the process of refining or protecting a wooden surface, especially in the production of furniture.
- Wood finishing starts with sanding either by hand, typically using a sanding block or power sander, scraping, or planing.
- Imperfections or nail holes on the surface may be filled using wood putty or pores may be filled using wood filler. Often, the wood's color is changed by staining, bleaching, or any of a number of other techniques.

# METALWORKING

- Once the wood surface is prepared and stained, the finish is applied. It usually consists of several coats of wax, shellac, drying oil, lacquer, varnish, or paint, and each coat is typically followed by sanding.
- Finally, the surface may be polished or buffed using steel wool, pumice, rotten stone or other materials, depending on the shine desired. Often, a final coat of wax is applied over the finish to add a degree of protection.

# METALWORKING

- French polishing is a finishing method of applying many thin coats of shellac using a rubbing pad, yielding a very fine glossy finish.
- Ammonia fuming is a traditional process for darkening and enriching the color of white oak. Ammonia fumes react with the natural tannins in the wood and cause it to change colours. The resulting product is known as "fumed oak".

# CHEMICAL MECHANICAL POLISHING

- Chemical Mechanical Polishing is a process of smoothing surfaces with the combination of chemical and mechanical forces. It can be thought of as a hybrid of chemical etching and free abrasive polishing.
- The process uses an abrasive and corrosive chemical slurry (commonly a colloid) in conjunction with a polishing pad and retaining ring, typically of a greater diameter than the wafer.

# CHEMICAL MECHANICAL POLISHING

- The dynamic polishing head is rotated with different axes of rotation (i.e., not concentric). This removes material and tends to even out any irregular topography, making the wafer flat or planar. This may be necessary to set up the wafer for the formation of additional circuit elements.

# FLAME POLISHING

- Flame polishing is a method of polishing a material, usually thermoplastics or glass, by exposing it to a flame or heat.
- By melting the surface of the material, surface tension smooths the surface out.
- Operator skill is critical with this method.
- When done properly, flame plastic polishing produces the clearest finish, especially when polishing acrylic.



# FLAME POLISHING

- This method is most applicable to flat external surfaces. Flame polishing is frequently used in acrylic plastic fabrication because of its high speed when compared to abrasive methods. In this application, a torch burning hydrogen and oxygen is typically used, one reason being that the flame chemistry is unlikely to contaminate the plastic.
- Flame polishing is essential to creation of the glass pipettes used for the patch clamp technique of voltage clamping.

# VAPOUR POLISHING

- **Vapor polishing** is a method of polishing plastics to reduce the surface roughness or improve clarity.
- Typically, a component is exposed to a chemical vapor causing the surface to flow thereby improving the surface finish.
- This method of polishing is frequently used to return clear materials to an optical quality finish after machining. Vapor polishing works well in the internal features of components.

# VAPOUR POLISHING

- Plastics that respond well to vapor polishing are polycarbonate, acrylic, polysulfone, PEI, and ABS.
- The technique is also being used to improve the surface of objects created with 3d printing techniques. As the printer deposits layer upon layer of material to build the object, the surface is often not entirely smooth. The smoothness of the surface can be greatly increased by vapor polishing

**THANK YOU**