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Polishing Pad Characteristics

Oftentimes the choice of the proper polishing pad can be quite confusing. In the past, choosing a polishing cloth or polishing pads was primary based on trial and error testing. More recently, with the more critical polishing requirements for the semiconductor industry, data storage market and fiber optics, the polishing surface and characterizing the effect of the polishing process has been examined more carefully. Thus the performance of a polishing pad is now characterized by its hardness, thickness, density (porosity), compressibility, texture, stiffness; and to a certain extent its interaction with the abrasive or polishing extender or lubricant.

In general, polishing pads for metallographic polishing are classified by the nap of the polishing cloth. High napped polishing cloths are generally used

where surface finish is more important than flatness. High napped polishing pads are characterized by relatively lower densities, lower hardness, greater thickness, high compressibility and low stiffness. Common abrasives used with high napped polishing pads include alumina and colloidal silica.

Low napped polishing pads find applications in the coarser polishing steps and for applications where specimen flatness, especially across materials of vastly different hardness (e.g. coating or plating analysis, hardened steels, etc.). The characteristics of a low napped polishing pad include: higher density, higher hardness, lower thickness, low compressibility, smoother texture and higher stiffness. Common abrasives used on low napped polishing pads include diamond, and/or colloidal silica in the case of CMP (chemical mechanical planarization polishing processes).

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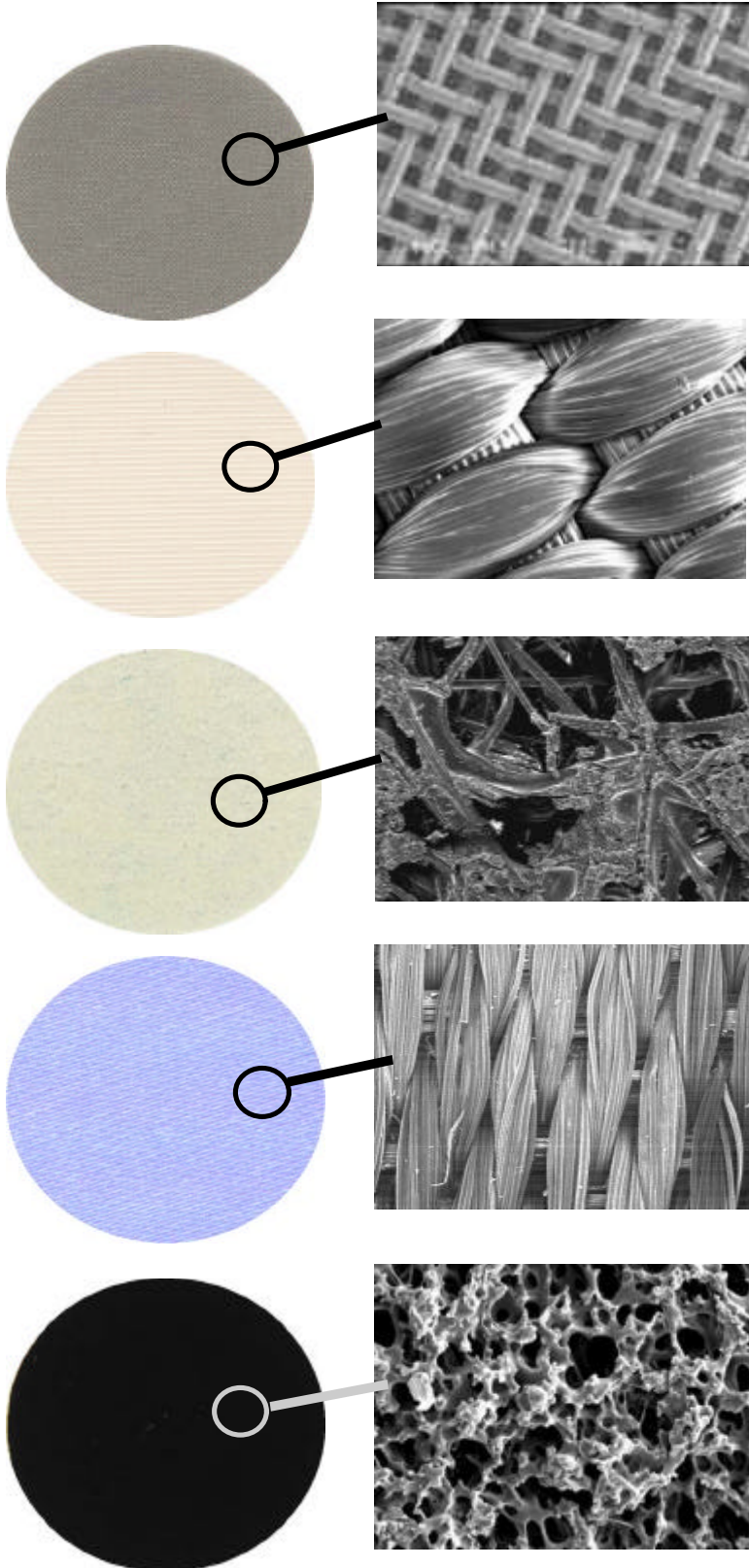
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Considerations for proper Polishing Pad Selection

- Specimen flatness
- Specimen surface finish
- Polishing abrasive
- Specimen brittleness and hardness

Characteristic	High Napped Polishing Pads	Low Napped Polishing Pads
Density	Low	High
Hardness	Low	High
Thickness	High	Low
Compressibility	High	Low
Texture	Fibrous	Flat / porous
Stiffness (modulus)	Low	High

Application	High Napped Polishing Pads	Low Napped Polishing Pads
Flatness		v
Surface Finish	v	
Intermediate Polishing		v
Chemical Mechanical Polishing		v
Final Polishing	v	v



Metal Mesh cloth - this is a wire mesh material useful for coarse and intermediate lapping/polishing. The texture of this wire allows for the abrasive to become semi-fixed; thus offering the advantage of increased stock removal, while minimizing damage.

POLYPAD™ Polishing Pad - this cloth is a low napped synthetic polyester polishing pad which has a similar action to a nylon pad, with the exception that it is much more durable. It is used in the intermediate polishing steps.

TEXPAN™ Polishing Pad - this is the most commonly used polishing cloth material for the intermediate polishing steps. TEXPAN™ Polishing pad is a non-woven low napped polishing pad.

DACRON® Polishing Cloth - this is a low napped polishing pad for polishing primarily with 1-15 micron diamond abrasives. The DACRON® pad is the most popular intermediate polishing pad in Europe and is used mostly for polishing metals. Its low nap provides it a very soft and gentle polishing action.

Note: DACRON® is a registered trade name of DUPONT® Corporation.

Black CHEM™ Polishing Pad - this is a porometric CMP polymer pad which has a consistency similar to a rubber type of pad. Black CHEM™ pad has a low nap but behaves as an intermediate polishing pad with a performance between low napped and high napped pads.

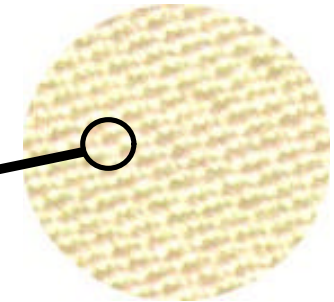
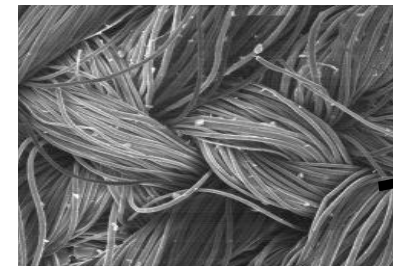
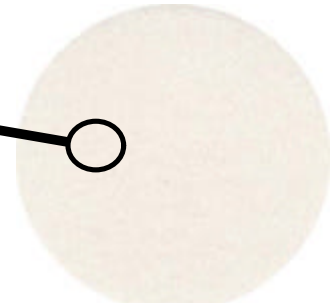
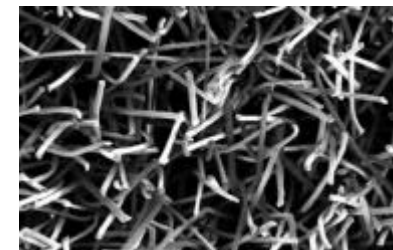
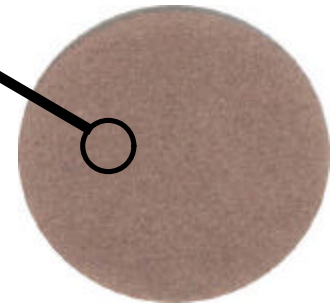
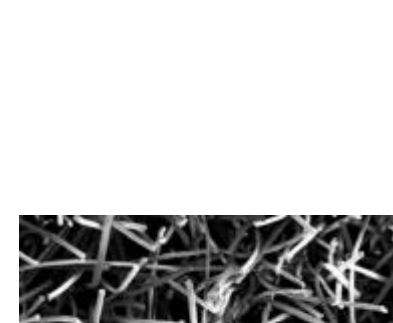
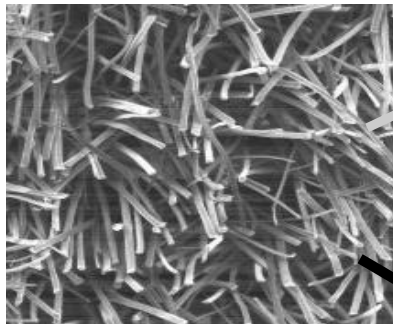
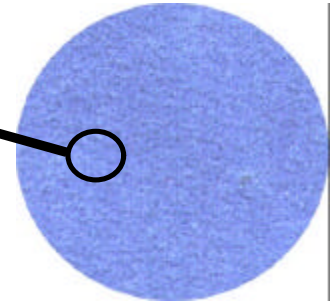
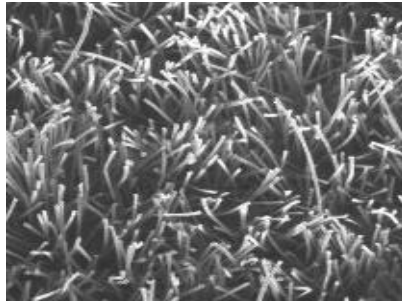
TRICOTE™ Polishing Cloth - this is a tightly woven high napped suede final polishing pad for metals and polymers. This cloth is very popular for final polishing with alumina and colloidal silica, especially for plated and coated specimens where edge retention is critical.

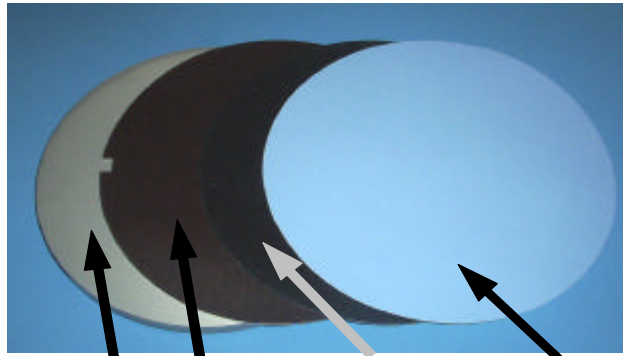
MICROPAD™ Polishing Cloth - this is the most common high napped final polishing pad for most metals and polymers. Its high nap provides it a very soft and gentle polishing action.

MICROPAD™ Extra Polishing Cloth - this is a premium edition of the most common high napped final polishing cloth for metals and polymers. Its high nap provides it a very soft and gentle polishing action.

NAPPAD™ Polishing Pad - this is another high napped final polishing pad useful for most metals and polymers. It has a higher nap than MICROPAD™, providing it with a very gentle polishing action which is very useful for polishing soft materials such as copper, aluminum and austenite steels.

MOLTEC™ Polishing Pad - this is wool polishing cloth used for final polishing and has a very high nap. It is most commonly used for final polishing metals where edge retention is a minor consideration.



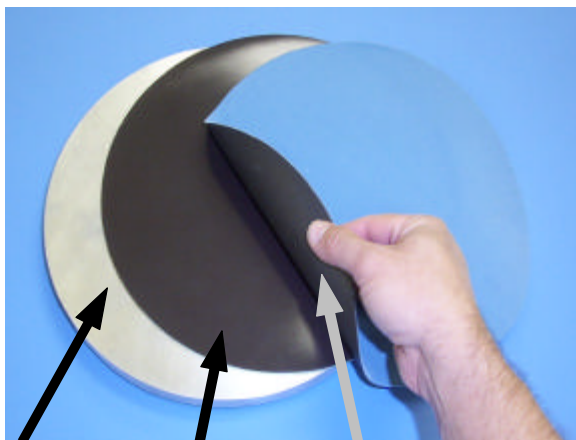


Working Plate
 MAGNETON™ PSA base
 MAGNEPAD™ Magnetic plate
 Polishing Pad (PSA)

Magnetic Polishing Pads

For ease of use, rapid changing and for storage convenience, magnetic backed polishing pads are used. This system consists of a magnetized PSA backed base which is permanently attached to the working wheel via an adhesive or PSA backing (see image and drawing above).

Either standard PSA backed polishing pads can be attached to a magnetic base plate or the polishing pads can be purchased with an flexible magnet backing already attached (see image and drawing below).



Working Plate
 MAGNETON™ PSA base
 Polishing Pad (with magnetic backing)

Polishing Cloth w/ PSA backing

MAGNEPAD™ Magnetic Support Plate

MAGNETON™ Magnetic PSA Base

Working Plate

Magnetic Polishing System using standard PSA backed polishing pads.

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Polishing Cloth w/ Magnetic backing

MAGNETON™ Magnetic PSA Base

Working Plate

Magnetic Polishing System with magnetic backing on polishing cloth.