Grease-Free Cleaning of Parts for Vacuum Systems

Wilbur C. Bigelow, University of Michigan

There are many reasons for NOT using grease-base polishes for cleaning parts to be inserted into the interior of high vacuum systems, as is so commonly done in electron microscopy laboratories. This matter is discussed in some detail in my book *Vacuum Methods in Electron Microscopy*, (Portland Press, Ashgate Publishers, 800-535-9544), pp. 69-74.

Basically, one principal reason for cleaning most parts in the first place is to remove hydrocarbon materials from their surfaces, and so it makes no sense at all to use a greasy material to do the job. This is the equivalent of taking a bath in a mud puddle. Then, it becomes necessary to use 'toxic' organic solvents to remove the grease-base compounds, which in turn generates expensive and annoying procedures for the use and disposal of the solvents. In addition, the grease and abrasive materials are likely to get embedded in cracks and crevices of the parts on which they are used, and since they often are not readily soluble they may not be completely removed, whereupon they will subsequently act as a persistent source of contamination inside the vacuum system.

Instead, very effective cleaning can usually be accomplished by a water-based procedure, which involves simply: thoroughly scrubbing with one of the many modern detergent solutions formulated for use in the electronics industry (see above reference) or with Tilex Soap Scum Remover (available in most supermarkets), rinsing with running hot tap water, treating ultrasonically in a warm aqueous detergent solution, rinsing again with hot running tap water, rinsing thoroughly with reagent grade isopropyl alcohol, and drying with a gas blaster. This procedure involves no solvents other than water and isopropyl alcohol (a common constituent of rubbing alcohol, and therefore safer to use than most other common solvents) and should not require overly complicated safety procedures. It is quick and easy to perform, and it usually does the job quite nicely.

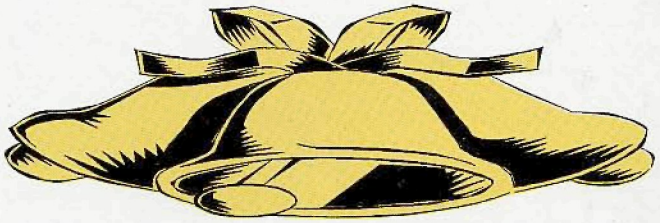
If you find you need an abrasive to remove stubborn deposits (or if you feel you must enhance the surface finish) try using a bit of Comet Cleanser (the kind formulated for use on plastic tubs and showers, which won't seriously scratch most metals) and then rinsing with hot water, before the initial scrubbing step.

Drying with a gas blaster is preferable to just letting the solvent evaporate, because then any residual contaminants dissolved in the alcohol are carried away as it is 'blasted' off the part, rather than being deposited on the part as they would be if the alcohol were allowed to simply evaporate from its surfaces. The part can, of course, subsequently be heated with a clean hair dryer to reduce surface moisture before it is put into the vacuum system.

Isopropyl alcohol seems preferable to acetone for the final rinse because it has better surface tension properties than acetone, it does not evaporate as quickly as acetone, and because most readily available grades of acetone leave a deposit on surfaces from which they evaporate.

The Tilex Soap Sum Remover is a very useful cleaning agent - it will even remove silicone oils from most metal surfaces. I have also used it to remove food spots of various kinds from clothing, grease spots from carpets and auto seat covers, and semi-dried paint from my hands after painting. Needless to say, it works great for its intended purpose of cleaning bathtubs, wash basins, shower curtains and shower tiles. (No commercial interest, it is just very handy stuff to know about). ■

Dr. Bigelow's new book "Vacuum Methods in Electron Microscopy", published by Portland Press, is available in the U.S. from Ashgate Publishing Company, Old Post Road, VT 05036, Tel.: (800)535-9544, Fax: (802)276-3837. The price for the soft cover version is $80.00 and $175.00 for the hard cover version, each with $3.75 for shipping and handling.



Front Page Image

The Shroud of Turin

This photograph of the Shroud of Turin is Figure 14 in a book *Judgement Day for the Turin Shroud* by Walter C. McCrone to be published this month by Microscope Publications, a Division of McCrone Research Institute. A short section of this book has been adapted slightly to appear as an article in this issue of *Microscopy Today*, starting on page 14. This photo shows a number of small rectangles, each one about 2" x 5/8" of a clear sticky tape applied to the shroud linen surface. On removal they each removed hundreds of linen fibers and any other particulate substances on that area of surface. The 32 tapes represent body (e.g., 1-EB) and blood (e.g., 3-CB) image areas as well as clean areas (e.g., 4-F) and scorched areas (e.g., 3-FE). The latter from a fire in 1532 that burned through a corner and one edge of a 12" x 20" pad of folded Shroud. Dr. McCrone has spent one year (1974) studying these tapes before concluding the Shroud is an inspired painting - and 17 years defending his findings.

MICROSCOPY TODAY

A monthly newsletter dedicated to the unique interests in microscopy and mailed to some 8,000 microscopists worldwide - at no cost in the U.S. and with a modest international charge.

PO Box 620122, Middleton, WI 53562 - Tel.: (608)836-1970 - Fax: (608)836-1969 - eMail: MicroToday@aol.com

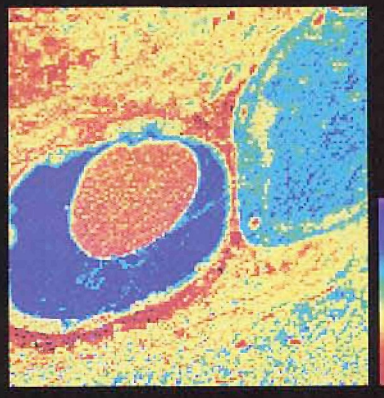
http://www.microscopy-today.com

Don Grimes, Editor

MICROSCOPY & MICROANALYSIS

Cleveland, August 10-14, 1997
Cleveland Convention Center

Including the World's Largest Commercial Exhibition of Related Equipment, Supplies, Software and Services



Leapman, Sun, Hunt & Andrews
EELS Water Map of Cerebellar Cortex

Microscopy Society of America
Microbeam Analysis Society
Histochemical Society

Over 225 Commercial Exhibit Booths
Over 600 Scientific Papers
Over 50 Scientific Sessions
Contributed Paper and Poster Sessions on All Aspects of Microscopy and Microanalysis

INVITED SYMPOSIA

BIOLOGICAL SCIENCES

- 3D Structural Function of Cells & Organelles
- Cancer: Abnormal Cell Growth or Apoptosis?
- Genomes, Chromosomes & Genes
- Multi-Photon Excitation Imaging
- Green Fluorescent Protein
- New Visions of the Vasculature
- Novel Microscopic Approaches to Cellular Damage and Repair
- Solving Microbiological Problems with Microscopy

PHYSICAL SCIENCES

- Nanocrystals & Nanocomposites
- Electronic and Magnetic Materials
- Segregation & Diffusion Analysis in Materials
- In-Situ Studies in Microscopy
- Materials Science Applications of Microdiffraction Methods in the SEM
- Atomic Structure & Mechanisms at Interfaces in Materials

IMAGING SCIENCES

- Computational Advances for 3D Microscopies in Biology
- Low Voltage SEM Imaging & Analysis
- Environmental SEM
- Scanned Probe Microscopies
- The Limits of Image Resolution
- Computational Methods in Microscopy
- Digital Microscopy: What are its Limits?

ANALYTICAL SCIENCES

- Light Microscopy: Recent Advances
- Quantitative Microanalysis by Electrons & X-rays
- Optical Microanalysis
- Microscopy and Microanalysis Showstoppers
- Analytical Electron Microscopy
- Quantitative Analysis for Series of Spectra & Images
- Electron Crystallography

SHORT COURSES

- Digital Imaging
- Practical Confocal Microscopy
- Using the Tools of Stereology
- Basic TEM for Materials Science
- Methods of Polarized LM in Materials Science
- Solid-State Laser Multi-Photon Excitation Imaging
- Recent Advances in Labelling Techniques for Immunocytochemistry

TUTORIALS

- Video Light Microscopy
- Confocal vs Widefield Deconvolution
- Introduction to Electron Back-Scattered Diffraction Pattern Analysis
- Environmental SEM

OTHER MAJOR PRESENTATIONS

- Multi-Photon Excitation Imaging
- Tyramide Signal Amplification
- Problem Solving Sessions with the Experts
- Practical Microscopy Techniques
- Ethics in Digital Imaging
- Access to Critical Instrumentation

ABSTRACTS DUE MARCH 15, 1997

FOR MORE INFORMATION ON ATTENDING OR EXHIBITING

Microscopy & Microanalysis '97
4 Barlows Landing Rd., Suite 8 · Pocasset, MA 02559
800-538-3672 or 508-563-1155 or Fax: 508-563-1211
E-mail: BusinessOffice@MSA.Microscopy.Com
World Wide Web: http://www.MSA.Microscopy.Com