



Fall 2004 Newsletter

Serving your analytical needs since 1998

September 2004

Attend our 2004 Open House Friday, October 1st

Call to Register

Did You Know?

(Part 1)

- IMR completed over 12,000 projects in 2003
- IMR employs nearly 80 engineers, scientists, and support staff
- Jeff has a spectrometer in his office for sale
- IMR has a new website www.imrtest.com



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RoHS Compliance: Testing the Materials Used in Electrical and Electronic Equipment

By Tim McGrady, Principle Scientist
IMR Test Labs (Ithaca, NY)



"If you haven't heard of RoHS - you will"



Thousands of products are effected by RoHS.

The European Union published Directive 2002/95/EC on the Restriction of certain Hazardous Substances (RoHS, pronounced "ross") in electrical and electronic equipment in February of 2003. The RoHS Directive limits the concentrations of cadmium (Cd), lead (Pb), mercury (Hg), hexavalent chromium (Cr⁶⁺), polybrominated biphenyls (PBBs), and polybrominated diphenyl ethers (PBDEs) to certain maximum concentration values (MCVs). The proposed MCVs are 0.01% by weight for cadmium, and 0.1% by weight for all other RoHS substances. In most cases, products put on the market in the EU after July 1, 2006 must not contain the listed substances in concentrations above the MCVs. Market surveillance in the EU by customs and health officials is likely to be aggressive.

The list of products covered by RoHS is enormous and includes large appliances (microwaves, refrigerators), small appliances (toasters, can-openers), IT and telecommunications equipment (computers, telephones), consumer equipment (TVs, stereo equipment), luminaires (fluorescent lamps), electrical and electronic tools (electric drills, saws), toys, leisure and sports equipment (electric trains, slot machines, video games), and automatic dispensers (vending machines, ATMs). Two other categories that

may be included at a later date are medical devices and monitoring and control devices (includes analytical instruments). The scope of RoHS and examples are listed in Annexes IA and IB of its sister document, the WEEE Directive (2002/96/EC). - *Continued on Page 2*

IMR Test Labs - Charleston Update

Our expansion last Spring has made a big difference in our operation. The added space has allowed us to bring in new equipment and enabled us to create a dedicated customer entrance so clients may visit without going through the manufacturing complex.

Certifications:

The Charleston facility was reaccredited by A2LA and was recertified to ISO 17025. Additional certification audits were conducted by Parker-Hannifin and SKF Corporation. We are happy to submit to customer audits in order to provide our customers with the assurance that we are committed to the highest quality standards.



Microhardness Testing

By Doug Puerta, Manager of Metallurgical Services
IMR Test Labs (Ithaca, NY)



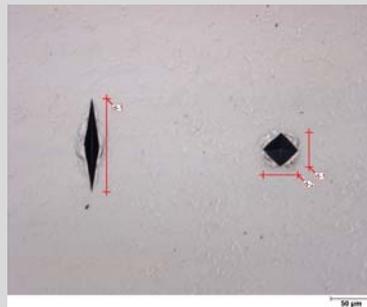
One of the more common tasks performed in the Metallurgical Services Department is microhardness testing. This test alone can be used to gain a great deal of insight into the broader mechanical properties of a material, the condition of the material (i.e. heat treated, cold worked), or the presence of material non-uniformities.

Microhardness testing is performed by measuring either a Knoop or Vickers diamond indent, applied to a test specimen with a load of up to 1,000 grams. In order to measure this indent as accurately as possible, this test is typically performed on a polished cross-section of the sample. The complete test procedure can be referenced in ASTM E 384-99.

One of the most frequent questions we get comes from customers performing surface treatments such as carburizing or electroplating, who are looking to measure hardness on a coating or surface treated region. Problems sometimes arise when this layer is not of sufficient thickness to accommodate a microhardness indent. Hence, the question of the day....

“How thick does my area of interest have to be in order to measure hardness?”

In short, there is no simple answer. For many materials, as long as an indent can be applied which meets the requirements outlined in E 384 (i.e. spacing from the edge of the sample), the resultant hardness value is valid. However, for some electroplated coatings, specific ASTM standards exist dictating the minimum plating thickness necessary for microhardness to be valid. For example, ASTM B 578-87 (1999) requires a minimum plating thickness of 38 microns for soft coatings (i.e. gold) and 25 microns for hard coatings (i.e. nickel, cobalt, iron). In both cases, the thickness requirement is equal to roughly 0.6 times the length of the long Knoop diagonal.



Knoop (left) and Vickers (right) indents

IMR Metallurgical Services - Louisville Update

IMR Metallurgical Services – Louisville has been expanding, steadily increasing the number of clients we serve. The scope of our testing capabilities has also grown, largely due to obtaining a second scanning electron microscope with an energy dispersive x-ray spectrometer, an ion chromatograph, a Fourier Transform Infrared Spectrometer, and various other analytical instruments. As our third year begins, we are hoping to develop even greater capacity and capabilities.



A2LA and Nadcap Accreditation Updates

By Deena Crossmore, VP-Corporate Quality, IMR Test Labs (Ithaca, NY)



In November 2003, IMR-Ithaca had their first renewal audit for Nadcap. The audit went smoothly and reapproval was granted. Just a few months later in February, IMR-Ithaca went through their A2LA audit for ISO 17025 reaccreditation. This, too, went extremely well and new certificates were granted. Lastly, by the time you receive this newsletter, IMR-Louisville will have gone through their first audit to get A2LA approval, which is scheduled for late September. If you have any questions regarding accreditation or approvals of any of the IMR labs, contact Deena Crossmore, VP-Corporate Quality, at deena@imrtest.com.

RoHS Compliance: Testing the Materials Used in Electrical and Electronic Equipment

Continued from front cover

The EU has stated that the basis for compliance is each 'homogeneous material' comprising EEE, and not the entire device or components. This is why the OEMs are requesting material declarations from their suppliers; it is much easier to test materials than it is to test fully assembled products. The supply chains for the various electrical and electronic OEMs must be very careful when making statements about their products, since the EU is allowing a 'due diligence' defense for any offense of RoHS. This means that if a material within an OEM's product is found non-compliant, but the OEM can show due diligence in the form of documentation from its suppliers, the suppliers may be prosecuted as if they committed the offense. And the penalties can be enormous – one manufacturer lost over \$90 million after having a product blocked from entry into the EU by Dutch customs and health officials.

IMR Test Labs has been working on RoHS issues for the past two years. In that time, we have developed sound, accurate test methods for determining RoHS substances in a wide variety of materials. We have worked with the US and EU governments, trade associations, scientific organizations, and industry on technical issues and are participating in the development of certified reference materials and standard test methods for RoHS testing. If you need your materials tested, or if you need further information, please contact Tim McGrady at (607) 533-7000, ext. 105.

New Equipment

IMR Test Labs (Ithaca, NY)

Thermo-Electron Nexus 470 FT-IR Spectrometer coupled with a Continuum IR Microscope

The Non-Metallics Department has upgraded the infrared capabilities of the lab with this acquisition. The Nexus 470 bench combined with the Continuum IR microscope is a state-of-the-art FTIR system that allows for infrared analysis of samples as small as 10µm. Additional accessories, including an automated stage and Atlas software, permit infrared mapping of small sample areas.

Archive 4 Images Image Analysis Station

In order to keep up with our ever-increasing demand for microstructural evaluation and characterization, the Metallurgy Department recently installed an *Archive 4 Images* image analysis system. This top-of-the-line system adds a great deal of automation to tasks such as grain size, plating/coating thickness, porosity, phase percentage, and dendrite arm spacing, among others. To compliment this new system, we have also added a new high resolution Jenoptik digital camera.

Struers Abermin Grinder/Polisher

Buehler Delta Abrasimet Chop Saw

An average week in the Metallurgy Department sees anywhere from 50 – 200 samples come through for sectioning, mounting, and metallographic preparation. In order to keep up with the large number of samples, a new Abrasimet chop saw and Abermin grinder/polisher should be installed by the time this newsletter reaches your mailbox. The new chop saw will enable most samples to be sectioned to “workable” sizes efficiently and safely. The new grinder/polisher provides the metallurgy lab with an industrial-grade polisher capable of handling both large mounts (up to 2” in diameter or up to 3” long) and high quantities (can polish up to 12 samples simultaneously).



LEO 435VP Scanning Electron Microscope

This instrument represents a significant expansion of the SEM capabilities in Ithaca, including a new EDS and extended variable pressure operation for the examination of non-conducting samples without the need for coating.



CDI-Sure Test Torque Tester

This tester is capable of reading from 4 in-lbs to 600 ft-lbs and will store multiple readings and give mean and standard deviation.

IMR Test Labs - Charleston (Charleston, SC)

Newage Indentron Hardness Tester

The Newage tester is capable of measuring surface and superficial hardness in a variety of scales. The unique, cantilevered indenter allows for easy access to otherwise difficult applications such as ring and race internal diameters and off-sets.



SEM Upgrade

As part of a company wide effort to upgrade our electron microscopy capabilities, our Cambridge SEM was recently fitted with a new EDS detector and imaging software. In addition to giving us a wide range of new capabilities, it puts Charleston on par with the other IMR facilities and allows us to share information more freely.

Singleton SCCH 23SL Chamber

IMR - Charleston expands capabilities in corrosion testing with the purchase of this 72” x 42” x 36” chamber. Coupled with our smaller Q-Fog chamber, different tests can now be run simultaneously using the two chambers. This will allow us more flexibility in scheduling corrosion testing in Charleston. The Singleton chamber will mainly be used for Salt Fog (ASTM B-117 or DIN 50021).



Did You Know?

(Part 2)

IMR manages complete laboratories for clients. In fact, we have staffed and/or managed as many as five client locations at one time.

Today we operate three labs for our clients in 3 different states. We are always looking for new opportunities. Call Jeff Zerilli at (607) 533-7000, Ext. 102 if you would like to learn more.

IMR has 12 metallurgists.

IMR has 6 SEMs.

IMR tests much more than materials. Our product testing group is up to the task when it comes to life cycle testing of almost anything.

The Ithaca facility is constructing a new 10,000 sq. ft. building to open in the summer of 2005.

All three locations accept major credit cards.



MATware, the Lab Information Management Software (LIMS) developed at IMR is now utilized in over 20 other client and independent laboratories. For a demonstration of this exceptional productivity tool, contact Denise Robinson denise@imrtest.com or Jeff Zerilli jeff.zerilli@imrtest.com.

New Employees

Kevin Kosty

Chemical Technician—Ithaca, NY

Kevin has a B.S. in Biochemistry from Nazareth College of Rochester. His work history includes two positions as Environmental Analyst. In his free time, he enjoys golfing and playing video games.



Steve Healey

Lead Engineer—Ithaca, NY

Steve earned his Masters in Materials Science at the Rochester Institute of Technology. His experience includes 12 years in the automotive industry, and his professional focus is on steel metallurgy and failure analysis. Besides sailing and mountain biking, Steve's hobbies include politics - he is a past candidate for Congress representing the Libertarian Party.



Jamie Allen

Technical Report Specialist—Ithaca, NY

Jamie received an AA in Liberal Arts from Tompkins-Cortland Community College and a BA from the State University of New York in English. Her experience as an Assistant Manager of a restaurant has helped her fit into the rapid pace of IMR's Chemical Analysis Department. Jamie spends her free time remodeling her house and cooking.



Linda Gmoser

Chemical Technician—Ithaca, NY

Linda earned an A.S. and a B.S. of Environmental Studies. She comes to IMR from Buckbee-Mears where she worked as a Chemical Technician. She likes camping and traveling - by the time you read this, she'll be visiting South Africa!



Karl Ripley

Machinist—Ithaca, NY

Karl is a certified New York State Journeyman Model Maker. He spent 19 years working in the Model Room at Smith Corona - he had the title Model Shop Group Leader for 7 of them. Karl's hobbies include bow hunting, street rods, and muscle cars.



Cheryl Downey

Metallurgical Lab Technician—Ithaca, NY

After three years of independent work studies for photography, Cheryl worked as an Engineering Technician for Buckbee-Mears. She is an active member on the Board of Trustees at the 1890 House in Cortland, NY and is Assistant to the President of the Cortland County Art League. Cheryl likes cooking, camping, and kayaking.



Scott Cotton

Chemical Technician—Ithaca, NY

Scott holds an Associates Degree in Engineering Science and a Bachelor's Degree in Ceramic Engineering. His



previous positions included Research Assistant and Lab Technician.

Mary Ann Genesky

Senior Laboratory Technician—Ithaca, NY

Mary Ann has a B.S. in Organizational Management and an A.A.S of Industrial Instrumentation Technology. Her previous work experience includes working as a Materials Technician with Xerox Corporation, a Process Technician with Advanced Vision Technologies, Inc., and a Process Technician with CVC Products, Inc. Mary Ann enjoys movies, golf, and baking.



Bob Hall

Chemist—Ithaca, NY

Bob holds an AAS degree in Chemical Technology. He has over 20 years of experience working as an Atomic Spectroscopist at Corning, Inc. where he published several R & D Reports. Bob has been an entertainer/musician for 35 years and enjoys spending time with his 4 grandchildren.



Jane Canfield

Administrative Assistant—Ithaca, NY

Jane worked in the banking industry for 14 years and achieved an AIB Customer Service Certificate and her Notary License. She spends her free time on motorcycle trips with her husband, and playing with her grandkids and her puppy.



Barb Andrews

Technical Report Specialist—Ithaca, NY

Barb earned her B.S. in Secondary Education with a Concentration in Mathematics at SUNY Oswego. She has over 20 years of experience working in Quality Assurance for a manufacturer in the aerospace industry. She loves being a sports mom - cheering at basketball, softball, baseball, and soccer games.



Brett Miller, P.E.

Sr. Metallurgical Engineer/Laboratory Director—Louisville, KY

Brett completed a Bachelor's Degree in Metallurgical Engineering at the University of Missouri-Rolla, and a Master's Degree in Materials Engineering at the University of Wisconsin-Milwaukee. He has over twenty years of metallurgical engineering and failure analysis experience.



William Collins

Laboratory Technician—Charleston, SC

William received an Associates Degree in Marine Technology at Cape Fear Technical College in Wilmington, NC. He's worked in the technical field for 18 years, primarily as a lab technician and a quality control technician. William and his wife like to camp and fish.



IMR Offers Practical Metallography Training

IMR Test Labs now offers practical metallography training, available as a customer-specific one or two day course. Based on the needs of the customer, this course can cover everything from sectioning, mounting, and polishing through etching, microscopy, and evaluation. The training is laboratory intensive, but will be supplemented by a comprehensive course handout. Students are encouraged to bring samples common to their workplace, and will be taught the latest metallographic methods. Please contact Doug Puerta, Manager of Metallurgical Services, for further information at (607) 533-7000, Ext. 168.



Commercially pure titanium (CPT) etched using dilute hydrofluoric acid and viewed under polarized light.

New Hot Tensile Capability

This past year the Mechanical department has achieved accreditations from Nadcap and A2LA for high temperature tensile testing up to 2000°F. This expands our temperature range from -220°F up to 2000°F. Please contact us for recommendations on sample size.

ASM Materials Camp

In 2000, ASM started a project called Materials Camp to try to reverse the declining number of Americans choosing Materials Engineering in graduate schools. That first camp had 30 students. This year there were 12 Materials Camps across the country, introducing nearly 400 students to materials science. In addition to the sponsors and organizers, professionals from across the country help make these camps possible by donating their time to act as Materials Mentors. IMR has supported Materials Camp for the past several years by donating a week of Ron Parrington's time to lead a group of these future engineers.



Ron Parrington and his group of high school students received a standing ovation for their failure presentation / skit from the 150+ person audience attending the closing ceremonies for Materials Camp

Employee News

Dave Feaveyear, *Mechanical Engineer*, attended a conference on electrostatics applications.

Redcliff Magill, *Mechanical Test Specialist, CWI*, completed Mechanical Testing of Metals and was accredited ACP Level II for visual optical testing of welds to go with his CWI certification.

Deb Gutchess, *Accounting/HR Specialist*, attended a program on the Fair Labor Standards Act.

Bill DeLaurier, *Non-Metallics Lab Supervisor*, passed the precursor exam for his P.E. license.

Neil Burns, *Failure Analyst/Corrosion Engineer*, completed the Principals of Failure Analysis course.

Ron Hughey, *Metallurgical Specialist*, completed Scanning Electron Microscopy and X-Ray Microanalysis, Elements of Metallurgy, and Principals of Failure Analysis.

Shawn Levey, *Metallurgical Lab Technician*, and Jason Brinkerhoff, *Metallurgical Lab Technician*, completed the self-study course Metallurgy for the Non-Metallurgist.

Deena Crossmore, *VP-Corporate Quality*, was recertified by The American Society for Quality (ASQ) as a Certified Quality Engineer.

Alexis Puerta, *Research Chemist, Ph.D.*, attended Quality Assurance/Quality Control in the Analytical Testing Laboratory provided by the American Chemical Society.

Tim McGrady, *Principle Scientist*, attended several events including: RoHS meeting at US Dept of Congress International Trade Administration, RoHS/WEEE meeting at Motorola, PITTCON 2004, ASTM B09, PM2TEC, ARMI ILAP.

Oh the Things We Do...

A sampling of the non-standard work performed at IMR's labs

Failure analysis of a landing gear component for an airplane

Vibration testing of a satellite

Actuation force measurement on an endoscopic surgical tool

Fuel cell component testing

Life cycle testing of tape measures

GCMS analysis of medical device cleaners

Wear testing of a fingerprint scanner

DSC analysis of solders

Evaluation of solvent damage to coatings

Mechanical properties of medical needles

Metallurgical analysis of thermal spray coating

On site metallurgical analysis of power plant components

Chemical analysis of dental amalgams

Salt spray exposure of an operating transmission component



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Not just data. Knowledge.



Service with a smile!

Free IMR golf shirt to the first 10 customers who can name this guy.
Email your answer to jeff.zerilli@imrtest.com.

IMR Test Labs Develops Aerospace Metallography Training Programs

In order to meet the industry-wide call for training in the preparation and evaluation of aerospace coatings, IMR has developed an extensive training course to meet these needs. Working closely with Art Geary (retired, Pratt & Whitney Aircraft Engines) and John Sauer (Sauer Engineering) this covers topics such as coating metallography, the coating process (thermal spray, PVD), and important characteristics for evaluation.

The Aerospace Metallography Training Program will be offered throughout the year, with a first offering planned for this fall. The training program can also be performed on-site for those customers who would prefer to train at their facility. Contact Doug Puerta, Manager of Metallurgical Services, for additional information at (607) 533-7000 Ext. 168.

ASTM E18 Update

By Melissa Gainey, Lab Manager
IMR Charleston (Charleston, SC)



IMR Labs routinely uses a tungsten ball indenter instead of a steel ball for the B and T scales. The most recent ASTM E18 standard allows for the use of steel or tungsten ball indenters as part of a planned transition to the exclusive use of tungsten ball indenters. This change is an improvement to the test since the steel balls tended to flatten with use and could affect the results. However, our customers should be advised that tests have shown that the tungsten ball can give slightly different results (up to one point less in the B scale) depending upon the hardness of the sample. We do maintain a steel ball indenter for those customers wishing to test with a historical comparison in mind. If this is your desire, please let us know when submitting your samples.

Visit our updated website www.imrtest.com