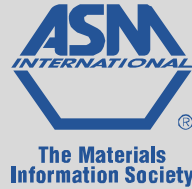


Metallography

Part 1 – Seminar

Part II- Practical Session

Part I Feb 19, 2009 Thursday
Part II Feb 20, 2009 Friday



**Edmonton
Chapter**

Venue

Alberta Research Council
Edmonton

ANNOUNCEMENT

Part I: Seminar

Introduction to Metallography

The presentation provides an overview to the science of metallography, that is, the study of the macrostructure and microstructure of metals (which has been extended to the study of non-metallic materials) using visual and light (reflected) optical examination procedures. The same methods can be applied to specimens examined with the scanning electron microscope and for performing chemical analysis using the electron microprobe. Use of transmitted light requires somewhat different preparation procedures common to mineralogy and petrography, but is the same in principle. The talk presents details of the key factors necessary to prepare specimens so that the true microstructure can be observed. Color tint etching techniques will also be illustrated.

Microstructure of Iron-Based Alloys

No other alloy system is as complex and diverse as iron-based alloys. However, terminology is often confused and obsolete terms are sometimes used. This talk will review microstructural terminology for ferrous alloy phases and constituents. A wide variety of phases and constituents will be illustrated using a variety of etchants, many in color. The examples will cover irons and a wide variety of steel compositions, from sheet steel to stainless and maraging steels.

Metallography of Welds

The microstructure of welds are fascinating to study metallographically as they usually consist of regions that are cast and wrought with variations in grain size and shape, and the potential for a wide variety of microstructures (depending upon the alloy composition) and hardnesses. The talk will illustrate weld microstructures in a wide variety of metals and alloys and by a wide variety of processes. Emphasis will be on the use of selective etchants and color techniques.

Metallography and Failure Analysis

Failure analysis is a complicated subject involving, depending upon the problem, expertise in many disciplines. Unfortunately, despite the knowledge that we have gained over the years regarding toughness, fracture mechanics, design and design calculation, and so forth, failures still happen. Metallurgists frequently get involved with failure analysis as the stuff that fails is made of "materials". For us old metallurgists, this is mainly metals, but other materials have been known to fail as well. We can learn a great deal about a failure by a study of the failed object. This includes examination of the fracture (if it failed by breaking) and the microstructure. The talk will illustrate how these techniques are used to determine "why stuff breaks" as Mac Louthan says.

Part II: Practical

There is an enrolment **limit of 10** only for the practical session.

This session covers the scientific and technical principles of preparing metallographic specimens in order to perfectly reveal the true microstructure of metals and materials. Our process is broken into the following categories: sampling, sectioning, mounting, grinding, polishing, etching and examination. Sampling must be adequate so that the material can be properly characterized. Sectioning is the most destructive and critical step in the process as it introduces the most damage and this damage must be removed if we are to see the true microstructure. Grinding removes the cutting damage, but also produces damage. Polishing removes the remaining grinding damage but must not introduce other problems, such as pull-out and pitting, while removing remnant deformation from preparation. Real deformation that may be in the specimen must be differentiable from specimen preparation-induced damage.

Not all etchants are created equal; some are more equal than others. Etchant selection is based upon what one is trying to observe and perhaps measure. Finally, the best microscope illumination mode must be chosen so that one can observe the microstructure most clearly. This requires a high quality microscope with good optical quality, and illumination modes such as the standard bright field, but also polarized light, Nomarski DIC and possibly dark field. Today, nearly all imaging is done electronically, so it is important to have a CCD camera with adequate resolution and convenient software for capturing and manipulating images. This lecture concentrates on the above sequence up to the examination stage.

Who Should Attend

Materials engineers, quality technicians, lab technicians and anyone with basic experience in metallographic sample preparation and microscopy

Prerequisites

None but some knowledge of Metallography is advantageous. While it is not necessary to enrol in Part I to Attend Part II the practical session, this is recommended.

Presenter

Dr. George F. Vander Voort

Director, Research & Technology
Buehler Ltd.

About the Presenter

George Vander Voort, Director of Research and Technology, Buehler Ltd., a graduate of Drexel and Lehigh Universities, had 29 years experience in the steel industry. A past president of the International Metallographic Society and past chairman of ASTM Committee E-4 on Metallography, George has over 250 publications, 6 patents, a video course, and 31 awards in metallography contests. He was a trustee for ASM International, and is on the editorial boards of *Materials Characterization*, *Praktische Metallographie* and the *International Journal of Microstructure and Materials Properties*.

Pre-register your seat now

Sean Sinfield

ASM Edmonton Chapter
c/o Black Cat Blades Ltd.
5604 – 59 Street
Edmonton T6B 3C3

Phone: (780) 577 6733

Email: sean.sinfield@blackcatblades.com

Metallography

Part 1 Seminar Feb 19, 2009 Thursday
Part 2 Practical Feb 20, 2009 Friday



The Materials
Information Society

Edmonton Chapter

Alberta Research Council ♦ 250 Karl Clark Road ♦ Edmonton

Attendee Name/s and Seminar or Practical	1. 2. 3. 4.	Part 1 / Part 2 Part 1 / Part 2 Part 1 / Part 2 Part 1 / Part 2
Company Name		
Address		
Phone		
Fax		
Email		
Are you a member of a Professional Society?	ASM, SME, NACE, ASME, AWS & CWS	
If so, Membership #		
Check Amount Enclosed	\$	

Do you agree to distribute your contact details to other attendees YES / NO

Part 1 SEMINAR	Before Feb 6, 2009	After Feb 7, 2009
Professional Society Members	\$295	\$345
Non-members	\$345	\$395
Students	\$100	\$150

PART 2 PRACTICAL	Before Feb 6, 2009	After Feb 7, 2009
Professional Society Members	\$595	\$645
Non-members	\$645	\$695
Students	\$300	\$350

Make checks payable to **ASM Edmonton Chapter**; do **not** add **GST**.

Mail to

ASM Edmonton Chapter
 c/o Sean Sinfield
 Black Cat Blades Ltd.
 5604 – 59 Street, Edmonton, Alberta T6B 3C3

Fax to (780) 463 6389