

Program
International Symposium
on
Stress Corrosion Cracking
in Structural Materials
at Ambient Temperatures

August 30 – September 4, 2009
Sheraton Padova, Padova, Italy

Conference Chairs

A.K. Vasudevan
ONR

Henry Holroyd
Luxfer, Inc.

Richard Ricker
NIST

Neville Moody
Sandia National Laboratories



Engineering Conferences International
32 Broadway, Suite 314
New York, NY 10004, USA
Phone: 1 - 212 - 514 - 6760, Fax: 1 - 212 - 514 - 6030
www.engconfintl.org – info@engconfintl.org

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Sunday, August 30, 2009

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|---------------|---------------------------------------|
| 17:00 - 19:00 | Conference check-in (Sheraton Padova) |
| 19:00 – 21:00 | Welcome reception with hors d'oeuvres |

NOTES

- Audiotaping, videotaping and photography of presentations are strictly prohibited.
- Invited Speakers have a total of 45 minutes for their presentation – 35 minutes for the talk and 10 minutes for questions. Please keep to the schedule.

All other speakers have a total of 35 minutes for their presentation – 25 minutes for the talk and 10 minutes for questions. Please keep to the schedule.

Session chairs will keep track of timing for their session.

- Please do not smoke at any conference functions.
- Turn your cellular telephones to vibrate or off during technical sessions.
- Be sure to make any corrections to your name/contact information on the Master Participant List or confirm that the listing is correct. A corrected copy will be sent to all participants after the conference.

Monday, August 31, 2009

07:00 – 08:45 Breakfast buffet

08:45 – 09:00 **Welcome and Announcements**

Session I: MECHANISMS

Session Chair: Dr. L Kabacoff, Office of Naval Research, USA

09:00 – 09:45 **AQUEOUS STRESS CORROSION CRACKING AND HYDROGEN EMBRITTLEMENT MODELS**

Meryl M. Hall Jr. (Invited), Retired, Monroeville, Pennsylvania, USA

09:45 – 10:20 **FACTORS AFFECTING NUCLEATION OF STRESS CORROSION CRACKS**

K. Sadananda, Technical Data Analysis, Falls Church, Virginia, USA

A. K. Vasudevan, Office of Naval Research, Virginia, USA

10:20 – 11:10 Coffee break

11:10 – 11:45 **COHESIVE ZONE FE SIMULATION OF HYDROGEN INFLUENCED SURFACE CRACK GROWTH INITIATION IN 25%CR DUPLEX STAINLESS STEEL**

Vigdis Olden, SINTEF, Trondheim, Norway

Christian Thaulow, Roy Johnsen, NTNU, Trondheim, Norway

Erling Østby, Torodd Berstad, SINTEF, Trondheim, Norway

11:45 – 12:20 **OBSERVATION AND MODELING OF STRESS CORROSION CRACKING**

A. Chudnovsky, The University of Illinois at Chicago, Chicago, Illinois, USA

B.-H Choi, Korea University, Seoul, Republic of Korea

12:30 – 14:00 Lunch at hotel

Session Chair: Dr. W. Dietzel, GKSS, Germany

14:00 – 14:45 **THE USE OF ATOMIC FORCE MICROSCOPY TO STUDY CRACK TIPS IN GLASS**

Sheldon Wiederhorn (Invited), National Institute of Standards and Technology, Gaithersburg, Maryland, USA

Jean-Pierre Guin, University of Rennes, Rennes, France

Theo Fett, University of Karlsruhe, Karlsruhe, Germany

14:45 – 15:20 **ROLES OF DE-ALLOYING IN STRESS CORROSION CRACKING**

Stan Lynch, Defense Science and Technology Organization, Melbourne, Victoria, Australia

15:20 – 15:50 Coffee break

15:50 – 16:25 **STRESS CORROSION CRACK TIP MORPHOLOGY AND CRACK TIP CHEMISTRY BOUNDARY CONDITIONS**

Richard E. Ricker, NIST, Gaithersburg, Maryland, USA

16:25 – 17:00 **CRACK-TIP CHEMISTRY DURING ENVIRONMENT-ENHANCED CRACKING OF ALUMINUM ALLOYS**

N. J. Henry Holroyd, Luxfer Gas Cylinders (Retired), Riverside, California, USA

17:00 - *Ad hoc* discussions/free time

Dinner on your own

Tuesday, September 1, 2009

- 07:00 – 08:45 Breakfast buffet
- 08:45 – 09:00 **Session II: MODELING**
Session Chair: Prof. S. Baragetti, University of Bergamo, Italy
- 09:00 – 09:35 **FIRST-PRINCIPLES STUDY ON THE DECOHESION OF GRAIN BOUNDARIES IN METALS BY HYDROGEN TRAPPING**
Masatake Yamaguchi, Japan Atomic Energy Agency, Tokai-mura, Ibaraki
Ken-ichi Ebihara, Mitsuhiro Itakura, Tomoko Kadoyoshi, Tomoaki Suzudo, Hideo Kaburakil, Japan
- 09:35 – 10:10 **HYDROGEN ASSISTED CRACKING IN ALUMINUM USING MODIFIED MONTE CARLO DYNAMICS**
K. N. Solanki, Center for Advanced Vehicular Systems, Mississippi State University, Starkville, Mississippi, USA
D.K. Ward, Mississippi State University, Mississippi, USA
- 10:10 – 10:40 Coffee break
- 10:40 – 11:15 **A CONSISTENT THERMODYNAMIC DESCRIPTION OF HYDROGEN DIFFUSION AND DEFECT INTERACTION IN A MATERIAL CONTAINING DISLOCATIONS, VOIDS AND MICRO-CRACKS**
D. J. Bammann, Center for Advanced Vehicular Systems, Mississippi State University, Starkville, Mississippi, USA
K.N. Solanki, Mississippi State University, Mississippi, USA
- 11:15 – 11:50 **FIRST-PRINCIPLES STUDY ON THE DECOHESION OF IRON (FE) GRAIN BOUNDARY BY SOLUTE (B, C, P, S) SEGREGATION**
Masatake Yamaguchi, Japan Atomic Energy Agency, Tokai-mura, Ibaraki, Japan
- 11:50 – 12:25 **STRESS CORROSION CRACKING IN CUSTOM 465 STAINLESS STEEL**
E. U. Lee, Naval Air Warfare Center Aircraft Division, Patuxent River, Maryland, USA
- 12:30 – 14:00 Lunch at hotel
- 14:00 - *Ad hoc* discussions/free time
Dinner on your own

Wednesday, September 2, 2009

07:00 – 08:45 Breakfast buffet

08:45 – 09:00

Session III: STRESS CORROSION

Session Chair: Dr. K. Solanki, Mississippi State University, USA

09:00 – 09.45

PRINCIPLES UNDERLYING THE STRESS CORROSION CRACK GROWTH

K. Sadananda (Invited), Technical Data Analysis, Falls Church, Virginia, USA

A.K. Vasudevan, Office of Naval Research, Virginia, USA

09:45 – 10:20

MECHANISMS OF SUBCRITICAL CRACK GROWTH IN GLASSES – ARE THEY REAL?

Sheldon M. Wiederhorn, National Institute of Standards and Technology, Gaithersburg, Maryland, USA

10:20 – 11:10

Coffee break

11:10 – 11:45

STRESS-CORROSION CRACKING IN PURE MAGNESIUM

Stan Lynch, Defense Science and Technology Organization, Melbourne, Victoria, Australia

11:45 – 12:20

ALLOY MICROSTRUCTURE & SLIP MODE ON THE SCC BEHAVIOR

A. K. Vasudevan, Office of Naval Research, Arlington, Virginia, USA

K.Sadananda, TDA Inc. Leesburg Pike, Virginia, USA

12:20 – 14:00

Lunch at hotel

Session Chair: Prof. T. Tsakalakos, Rutgers University, USA

14:00 – 14:35

THE ROLE OF PRECIPITATES IN THE STRESS CORROSION CRACKING OF SENSITIZED AA5083

David J. Quesnel, University of Rochester, Mechanical Engineering Department, Rochester, New York, USA

Jie Gao, University of Rochester, New York, USA

14:35 – 15:10

THE EFFECTS OF OVERAGING OF AA 7075 ON CORROSION, EXFOLIATION, AND STRESS CORROSION CRACKING

Richard E. Ricker, NIST, Gaithersburg, Maryland, USA

15:10 – 15:40

Coffee break

15:40 – 16:15

ON THE TRANSITION FROM CORROSION PITS TO STRESS CORROSION CRACKS

Alan Turnbull, National Physical Laboratory, Teddington, U.K.

D. A. Horner, B.J. Connolly, University of Birmingham, U.K.

S. Zhou, National Physical Laboratory, U.K.

16:15 – 16:50

STRESS-CORROSION CRACKING OF AISI 4340 STEEL IN AQUEOUS ENVIRONMENTS

Yanyao Jiang, Department of Mechanical Engineering, University of Nevada, Reno, Nevada, USA

Sergiy Kalnaus, Jixi Zhang University of Nevada, Reno, USA

16:50 -

Ad hoc discussions/free time

Dinner on your own

Thursday, September 3, 2009

- 07:00 – 08:45 Breakfast buffet
- 08:45 – 09:00 **Session IV: DISSOLUTION**
Session Chair: Dr. Michelle Koul, U.S. Naval Academy, USA
- 09:00 – 09:45 **DISSOLUTION CONDENSATION MECHANISM OF LIQUID METAL EMBRITTLEMENT**
Evgeny E. Glickman (Invited), Tel Aviv University, Ramat Aviv, Tel Aviv, Israel
- 09:45 – 10:20 **TRANSMISSION ELECTRON MICROSCOPIC INVESTIGATION OF AL BASE ALLOYS SUSCEPTIBLE TO STRESS CORROSION CRACKING**
Ramasis Goswami, SAIC/Naval Research Laboratory, Washington DC, USA
P.S. Pao, G. Spanos, R.L. Holtz, Naval Research Laboratory, Washington DC, USA
- 10:20 – 11:10 Coffee break
- 11:10 – 11:45 **MECHANISMS THAT CONTROL THE KINETICS OF ANODIC DISSOLUTION DURING STRESS CORROSION CRACKING**
David J. Quesnel, Mechanical Engineering Dept., University of Rochester, Rochester, New York, USA
Yingrui Zhang, Quanhe Wan, University of Rochester, New York, USA
- 11:45 – 12:20 **STRESS INTENSITY FACTOR DEPENDENCE OF HG-LME IN ALUMINUM**
Scott G. Keller, University of Central Florida, Orlando, Florida, USA
Ali P. Gordon, University of Central Florida, Florida, USA
- 12:30 – 14:00 Lunch at hotel
- Session V: GENERAL TOPICS**
Session Chair: Dr. S. Lynch, Defense Science & Technology, Australia
- 14:00 – 14:45 **MULTISCALE STRAIN MAPPING OF STRESS CORROSION CRACKING BY SYNCHROTRON PROBE**
Thomas Tsakalakos, Rutgers University, Piscataway, New Jersey, USA
- 14:45 – 15:20 **STRESS CORROSION CRACKING - CREVICE INTERACTION IN AUSTENITIC STAINLESS STEELS CHARACTERIZED BY ACOUSTIC EMISSION**
Heikki Leinonen, VTT Technical Research Centre of Finland, Finland
Tanja Schild, Hannu Hännien, Helsinki University of Technology, Finland
- 15:20 – 16:10 Coffee break
- 16:10 – 16:45 **AN ENVIRONMENTALLY ASSISTED CRACKING EVALUATION OF HIGH TOUGHNESS NI-BASED ALLOYS UNDER CATHODIC PROTECTION CONDITIONS**
Michelle G. Koul, United States Naval Academy, Annapolis, Maryland, USA
- 16:45 – 17:20 **ANALYSIS OF DEFORMATION RATE ON SCC BEHAVIOR**
Daniel Kujawski, Western Michigan University, Kalamazoo, Michigan, USA
A. K. Vasudevan, Office of Naval Research, Virginia, USA
- 17:20 – 20:00 *Ad hoc* discussions/free time
- 20:00 - Conference Banquet

Friday, September 4, 2009

- 07:00 – 08:45 Breakfast (Buffet)
- 08:45 – 09:00 **Session VI: INTERNAL STRESS/LOADING RATES**
Session Chair: Dr. H. Leinonen, VTT Tech Research, Finland
- 09:00 – 09:35 **STUDY ON THE SULFIDE STRESS CORROSION MECHANISM OF LINE-PIPES STEELS BY SLOW STRAIN RATE METHOD**
Yong Choi¹ and Sang Ho Kim^{2, 1} Sunmoon University, Korea; ² Korea University of Technology and Education, Korea
- 09:35 – 10:10 **RISING LOAD/RISING DISPLACEMENT SCC TESTING**
Wolfgang Dietzel, GKSS - Forschungszentrum Geesthacht GmbH, Geesthacht, Germany
- 10:10 – 10:40 **EFFECT OF LOADING HISTORY ON STRESS CORROSION CRACKING OF 7075-T651 ALUMINUM ALLOY IN SALINE AQUEOUS ENVIRONMENT**
Yanyao Jiang, Department of Mechanical Engineering, University of Nevada, Reno, Nevada, USA
Jixi Zhang, Sergiy Kalnaus, Majid Behrooz, University of Nevada, Reno, USA
- 10:40 – 11:10 Coffee break
- 11:10 – 11:45 **ROLE OF INTERNAL STRESS ON STRESS CORROSION CRACK GROWTH BEHAVIOR**
A. K. Vasudevan, Office of Naval Research, Arlington, Virginia, USA
K.Sadananda, TDA Inc., Leesburg Pike, Virginia, USA
- 11:45 – 12:30 Organizers EPILOG-comments, remarks, discussions and departures