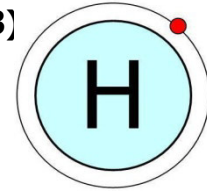


5th International Conference on Structural Integrity (ICSI2023)

29 August – 1 September 2023. Funchal, Madeira, Portugal

<https://www.icsi.pt/>



TC21 Thematic/Special Symposium

(<https://www.icsi.pt/thematic-symposia-2023/>) with a round table and panel discussions

Hydrogen embrittlement of metals: Problems and solutions

By TC21 "Hydrogen embrittlement and Transport" of the European Structural Integrity Society – ESIS (<https://sites.google.com/structuralintegrity.eu/tc21>) and Prof. Frank Cheng

TENTATIVE PROGRAM - 44 abstracts (03.04.2023)

TC21 Thematic/Special Symposium - Organizing committee

Prof. Milos B. Djukic (mdjukic@mas.bg.ac.rs), University of Belgrade, Faculty of Mechanical Engineering, Serbia

Prof. Frank Cheng (fcheng@ucalgary.ca), University of Calgary, Schulich School of Engineering, Canada

Motomichi Koyama, Assoc. Prof. (koyama@imr.tohoku.ac.jp), Tohoku University, Japan

Tom Depover, Asst. Prof. (Tom.Depover@UGent.be), University of Ghent, Belgium

Dr. Antonio Alvaro (antonio.alvaro@sintef.no) SINTEF, Norwegian University of Science and Technology, Norway

Emilio Martinez-Paneda, Senior Lecturer (Assoc. Prof.) (e.martinez-paneda@imperial.ac.uk), Imperial College London, Faculty of Engineering, UK

We kindly invite you to participate in the HE Thematic/Special Symposium.

The deadline for the abstract submission is March 31, 2023.

- **The abstract** should be prepared according to the template, which can be downloaded from www.icsi.pt/files/2023/abstract_icsi2023.docx and submitted by email to icsi@icsi.pt and mdjukic@mas.bg.ac.rs before March 31, 2023.
- **When submitting your abstract to ECF23 please mention the name** of the Thematic Symposium - "Hydrogen embrittlement of metals: Problems and solutions".

TENTATIVE PROGRAM (03.04.2023)

We have **44 abstracts** submitted for oral presentations, including 1 ICSI2023 plenary talk, and 10 TC21 Thematic/Special Symposium invited talks.

The updated list of confirmed – submitted Plenary/Invited lectures (TC21 Thematic/Special HE Symposium invited talks, 28.03.2023):

1. **Prof. Frank Cheng**, University of Calgary, Schulich School of Engineering, Canada, ICSI2023 plenary talk: ***"Fundamental insights into the hydrogen embrittlement of pipelines in high-pressure gaseous environments"***.
(<https://www.icsi.pt/invited-speakers-4/>)
2. **Prof. Jun Song**, McGill University, Canada: ***"Multiscale Modeling of Hydrogen Clustering and Bubbling in BCC Metals"***.
3. **Prof. Dr. Ir. Tom Depover**, University of Ghent, Faculty of Engineering and Architecture, Belgium: ***"Increasing the resistance to hydrogen embrittlement of martensitic medium carbon steels"***.
4. **Dr. Cem Örnek**, Asst. Prof, Leibniz-Institut für Werkstofforientierte Technologien, Germany, Istanbul Technical University, Turkey: ***"New Insights and Understanding of Hydrogen Embrittlement of Duplex Stainless Steel: Combined DFT Modelling and Experimental Study"***.
5. **Prof. V.S. Raja**, Institute Chair Professor, Dept. of Metallurgical Engineering and Materials Science, Indian Institute of Technology (ITT) Bombay, India: ***"Pathways for Developing Environmentally Assisted Cracking Resistant High Strength Al-alloys"***.
6. **Dr. Eng. Motomichi Koyama**, Associate Professor, Institute for Materials Research, Tohoku University, Japan, invited online talk: ***"Characteristics of local plasticity and boundary character in hydrogen-assisted intergranular and intergranular-like fracture paths"***.
7. **Dr. Masoud Moshtaghi**, Senior Scientist, Chair of General and Analytical Chemistry Montanuniversität Leoben, Austria: ***"Recent developments in understanding the mechanisms of hydrogen embrittlement and trapping behaviour in Al alloys"***.
8. **Prof. Frank Cheng**, University of Calgary, Schulich School of Engineering, Canada: ***"Study of hydrogen atom distribution at metallurgical features and mechanical defects contained in pipeline steels by scanning Kelvin probe force microscopy and finite element modeling"***.
9. **Prof. Emeritus Dan Eliezer**, Ben-Gurion University of the Negev, Department of Materials Engineering, Israel, the title of the invited talk: ***"Hydrogen embrittlement in structural materials: theory and applications"***.

10. **Prof. Akihiko Fukunaga**, Department of Applied Chemistry, Waseda University, Japan: ***"Hydrogen embrittlement behavior of iron-based superalloy A286"***.

11. **Prof. Hong Luo**, Corrosion and Protection Center, University of Science and Technology Beijing, China: ***"Research on environmental degradation behavior and mechanism of high entropy alloys"***.

The updated list of submitted abstract – regular oral presentations
(TC21 Thematic/Special HE Symposium, 03.04.2023):

1. **Hsiao Wei Lee**¹, **Milos B. Djukic**², **Cemal Basaran**¹, ¹ University at Buffalo, Civil, Structural, and Environmental Engineering, Buffalo, USA, ² University of Belgrade, Faculty of Mechanical Engineering, Serbia: ***"Modelling fatigue life and hydrogen embrittlement of bcc steel with unified mechanics theory"***.

2. **Mihaela Iordachescu, Patricia Santos, Andres Valiente**, Materials Science Dpt., ETSI Caminos, Universidad Politécnica de Madrid, Spain: ***"Hydrogen effects in high-strength lath martensite steel bars for structural engineering"***.

3. **S. Kovacevic, M. Makuch, E. Martinez-Paneda**, Department of Civil and Environmental Engineering, Imperial College, UK: ***"Phase-field modelling of environmentally induced damage"***.

4. **Yuanxing Ning, Mingliang Liu, Cuiwei Li, Yuxing Li, Cailing Wang**, College of Pipeline and Civil Engineering in China University of Petroleum (East China), China, Shandong Key Laboratory of Oil-Gas Storage and Transportation Safety in China University of Petroleum (East China): ***"Finite element simulation of hydrogen diffusion in girth welds with realistic defects"***.

5. **Magdalena Eškinja**¹, **Masoud Moshtaghi**¹, **Gerald Winter**², **Jürgen Klarner**², **Gregor Mori**¹, ¹ Montanuniversität Leoben, Chair of General and Analytical Chemistry, Austria, ² voestalpine Tubulars GmbH & Co KG, Austria: ***"Influence of Mo content on susceptibility of medium carbon martensitic steels to hydrogen embrittlement"***.

6. **Renata Latypova**¹, **Eric Fangnon**², **Olli Nousiainen**¹, **Sakari Pallaspuuro**¹, **Jukka Kömi**¹, ¹ Materials and Mechanical Engineering, Centre for Advanced Steels Research, University of Oulu, Finland, ² Materials to Products, Department of Mechanical Engineering, School of Engineering, Aalto University, Finland: ***"Role of prior austenite grain structure in hydrogen diffusion, trapping and embrittlement mechanisms in as-quenched martensitic steels"***.

7. **Yuhei Ogawa**¹, **Osamu Takakuwa**², ¹ National Institute for Materials Science, Japan, ² Department of Mechanical Engineering, Kyushu University, Japan: ***"Hydrogen-assisted fatigue crack propagation in ferritic iron: An overview of macroscale behavior and microscale mechanisms"***.
8. **Á. Valverde-González**^{1,2}, **E. Araujo-Cabezón**², **E. Martínez-Pañeda**³, **J. Reinoso**², **M. Paggi**¹, ¹ IMT School for Advanced Studies, Italy, ² Departamento de Mecánica de Medios Continuos y Teoría de Estructuras. Escuela Técnica Superior de Ingeniería, Universidad de Sevilla, Spain, ³ Department of Civil and Environmental Engineering. Imperial College, UK: ***"Elucidating the contribution of grain boundary trapping in hydrogen-assisted fracture"***.
9. **Stefanie Pichler, Masoud Moshtaghi, Gregor Mori**, Chair of General and Analytical Chemistry, Montanuniversität Leoben, Austria: ***"Hydrogen trapping at micro/nano-sized secondary hardening precipitates"***.
10. **Robin Depraetere**¹, **Wim De Waele**¹, **Margo Cauwels**², **Tom Depover**², **Kim Verbeken**², **Stijn Hertelé**¹, ¹ Ghent University, Department of Electromechanical, Systems and Metal Engineering, Belgium, ² Ghent University, Department of Materials, Textiles and Chemical Engineering, Belgium: ***"Damage evolution investigation of two hydrogen-charged pipeline steels using X-ray micro-CT"***.
11. **Osamu Takakuwa**¹, **Yuhei Ogawa**², ¹ Department of Mechanical Engineering, Kyushu University, Japan, ² National Institute for Materials Science, Japan: ***"Hydrogen-accelerated/decelerated fatigue crack propagation in Ni-based superalloy 718"***.
12. **Liese Vandewalle, Tom Depover, Kim Verbeken**, Ghent University; Department of Materials, Textiles and Chemical Engineering; Sustainable Materials Science, Belgium: ***"Study of hydrogen trapping at carbides after gaseous charging at elevated temperatures and its impact on mechanical properties"***.
13. **Alessandro Campari**¹, **Florian Konert**², **Jonathan Nietzke**², **Oded Sobol**², **Nicola Paltrinieri**¹, **Antonio Alvaro**³, ¹ Norwegian University of Science and Technology (NTNU), Department of Mechanical and Industrial Engineering, Norway, ² Bundesanstalt für Materialforschung und -prüfung (BAM), Department of Component Safety, Germany, ³ SINTEF, SINTEF Industry, Norway: ***"Evaluation of the tensile properties of X65 pipeline steel in compressed gaseous hydrogen using hollow specimens"***.
14. **Mirjam Bajt Leban**¹, **Bojan Zajec**¹, **Bojan Podgornik**², **Tadeja Kosec**¹, ¹ Slovenian National Building and Civil Engineering Institute, Slovenia, ² Institute of Metals and Technology, Slovenia: ***"Comparison of hydrogen embrittlement susceptibility of martensitic stainless steel subjected to conventional and cryogenic heat treatment"***.

15. **Supriya Nandy**¹, **Sakari Pallaspuuro**², **Pekka Moilanen**¹, **Renata Latypova**², **Janne Pakarinen**¹, **Jukka Kömi**², **Elina Huttunen-Saarivirta**¹, ¹ VTT Technical Research Centre of Finland Ltd, Finland, ² Materials and Mechanical Engineering, Centre for Advanced Steels Research, University of Oulu, Finland: ***"Fatigue fracture in advanced ultrahigh-strength steels tested under gaseous hydrogen charging"***.
16. **L.B. Peral**^{1,2}, **A. Díaz**¹, **C. Rodríguez**², **J.M. Alegre**¹, **I.I. Cuesta**¹, ¹ Structural Integrity Research Group (GIE), University of Burgos, Spain, ² SIMUMECAMAT Research Group, University of Oviedo, Spain: ***"Evaluating hydrogen embrittlement susceptibility of a duplex stainless steel"***.
17. **Joshua Jackson**^{1,2}, **Craig Tod**², **Milos B. Djukic**³, **Bryan Fahimi**⁴, ¹ Applied Fracture Mechanics and US Corrosion Services, USA, ² Applied Fracture Mechanics, USA, ³ University of Belgrade, Faculty of Mechanical Engineering, Serbia, ⁴ SLB - OneSubSea, USA: ***"Advances in Quantitative Hydrogen Embrittlement Assessment"***.
18. **Laura De Pue**¹, **R. Jubica**², **Lisa Claeys**², **Somsubhro Chaudhuri**¹, **Tom Depover**², **Wim De Waele**¹, **Kim Verbeken**², **Stijn Hertelé**¹, ¹ Ghent University, Department of Electromechanical, Systems and Metal Engineering, Belgium, ² Ghent University, Department of Materials, Textiles and Chemical Engineering, Sustainable Materials Science, Belgium: ***"Hydrogen embrittlement determination of L485MB pipeline steel and its heat affected zone via notched tensile tests"***.
19. **Margo Cauwels**¹, **Robin Depraetere**², **Wim De Waele**², **Stijn Hertelé**², **Tom Depover**¹, **Kim Verbeken**¹, ¹ Ghent University, Department of Materials, Textiles and Chemical Engineering, Sustainable Materials Science, Belgium, ² Ghent University, Department of Electromechanical, Systems and Metal Engineering, Soete Laboratory, Belgium: ***"Hydrogen-assisted degradation of an X70 pipeline steel evaluated by single edge notched tension testing"***.
20. **Lisa Claeys**¹, **Hauke Springer**^{2,3}, **MohammadhosseinBarati Rizi**¹, **Kim Verbeken**¹, **Tom Depover**¹, ¹ Ghent University, Department of Materials, Textiles and Chemical Engineering, Research group Sustainable Materials Science, Belgium, ² Department of Microstructure Physics and Alloy Design, Max-Planck-Institut für Eisenforschung, Germany, ³ Institut für Bildsamen Formgebung, RWTH Aachen University, Germany: ***"Hydrogen interaction with an equiatomic CoCrFeMnNi high entropy alloy"***.
21. **Reza Khatib Zadeh Davani**¹, **Ehsan Entezari**¹, **Sandeep Yadav**¹, **Jhon Freddy AcerosCabezas**², **Jerzy Szpunar**¹, ¹ Department of Mechanical Engineering, University of Saskatchewan, Canada, ² Metallurgical Engineering and Materials Science Department, Universidad Industrial de Santander, Bucaramanga, Colombia: ***"The effect of austenitizing temperature on the hydrogen embrittlement of API 5L X100 pipeline steel"***.

22. **Guillaume Benoit¹, Denis Bertheau¹, Gilbert Henaff¹, Laurent Alvarez²**,
¹ Institut Pprime, France, ² TEREPA Pau – France: ***“Crack growth resistance of actual pipe welds exposed to hydrogen and natural gas mixture and pure hydrogen under high pressure”***.
23. **Esteban Rodoni¹, Tom Depover^{1,2}, Kim Verbeken², Mariano Iannuzzi¹**,
 Curtin Corrosion Centre, Curtin University, Australia, ² Department of Materials, Textiles and Chemical Engineering, Research group Sustainable Materials Science, Ghent University, Belgium: ***“Effect of Nickel on the hydrogen embrittlement, diffusion, and trapping properties of ferritic-martensitic dual-phase low alloy steel in tempered condition”***.
24. **Junichiro Moriyama¹, Osamu Takakuwa², Masatake Yamaguchi^{3,4,5}, Yuhei Ogawa⁶, Kaneaki Tsuzaki^{5,6,7}**, ¹ Graduate School of Mechanical Engineering, Kyushu University, Japan, ² Department of Mechanical Engineering, Kyushu University, Japan, ³ Center for Computational Science and e-Systems, Japan Atomic Energy agency, Japan, ⁴ Department of Materials Science and Engineering, the University of Tokyo, Japan, ⁵ Elements Strategy Initiative for Structural Materials, Kyoto University, Japan, ⁶ National Institute for Materials Science, Japan, ⁷ Kyushu University, Japan: ***“First-principles study on the hydrogen absorption energy in Fe-Cr-Ni austenitic systems: Effect of Cr and Ni content”***.
25. **Mohammad Mousavinia¹, Abdoulmajid Eslami², Ahmad Rezaeian², Reza Miresmaili³, Reg Eadie⁴, Weixing Chen⁴**, ^{1,2} Department of Materials Engineering, Isfahan University of Technology, Iran, ³ Department of Materials Engineering, Tarbiat Modares University of Technology, Iran, ⁴ Department of Chemical and Materials Engineering, University of Alberta, Canada: ***“Root cause failure analysis of an offshore pipeline subjected to environmental assisted cracking - A case study”***.
26. **Dillip Kumar Bisoyi¹ and Chinmayee Dash²**, ¹ Department of Physics and Astronomy, National Institute of Technology Rourkela, India, ² Department of Physics and Astronomy, National Institute of Technology Rourkela, India: ***“A Comparison Study on Environmental Effects of Natural and Synthetic Fiber Reinforced Polymer Composite (NFRPC) for their Potential Application”***.
27. **Milos B. Djukic¹, Jovana Perisic¹, Muhammad Wasim², Gordana Bakic¹, Aleksandar Sedmak¹, Bratislav Rajcic¹**, ¹ University of Belgrade, Faculty of Mechanical Engineering, Serbia, ² Department of Civil & Infrastructure Engineering, RMIT University, Australia: ***“The HELP+HEDE model for hydrogen embrittlement in metals: New insights and experimental/modeling confirmations”***.
28. **V.G. Gavriljuk, V.M. Shyvaniuk, S.M. Teus**, G.V. Kurdyumov Institute for Metal Physics, Vernadsky Blvd. 36, Kiev 03142, Ukraine: ***“Hydrogen Interaction with Dislocations in Relation to Hydrogen Embrittlement of Metals”***.

29. **Daria Pałgan, Markus Uhlirsch, Nuria Fuertes, Birhan Sefer**, SWERIM AB, Sweden: ***"Comparative study of hydrogen uptake in low alloyed carbon and austenitic stainless steels under cathodic hydrogen charging in aqueous electrolyte and gaseous hydrogen charging"***.
30. **Simon Laliberté-Riverin, Jonathan Bellemare, Frédéric Sirois, Myriam Brochu**, Polytechnique Montréal, 2500 ch. de Polytechnique, Montréal, H3T 1J4, Canada: ***"Post-mortem estimation of hydrogen embrittlement threshold on sustained-load test coupons using fractography and statistics of extreme values"***.
31. **Giuseppe Macoretta, Carlo Maria Belardini, Marco Beghini, Bernardo Disma Monelli, Renzo Valentini**, Department of Civil and Industrial Engineering, University of Pisa, Pisa, Italy: ***"Definition of a test-independent hydrogen embrittlement index for advanced high-strength steels"***.
32. **Mehmet Fazil Kapci, Burak Bal**, Department of Mechanical Engineering, Abdullah Gül University, Turkey: ***"Investigations of the hydrogen – defect interactions by Molecular Dynamics"***.
33. **Mehmet Furkan Baltacıoğlu, Burak Bal**, Department of Mechanical Engineering, Abdullah Gül University, Turkey: ***"Effect of Strain Rate and Hydrogen on The Mechanical Behaviors of Aluminum Alloys"***.