Program - Final

TC21 Thematic/Special Symposium
with a round table and panel discussion
Hydrogen embrittlement of metals: Problems and solutions
(TC21 "Hydrogen Embrittlement" Symposium)

Organized by:

Milos B. Djukic, Frank Cheng, Motomichi Koyama, Tom Depover, Antonio Alvaro and Emilio Martínez Pañeda

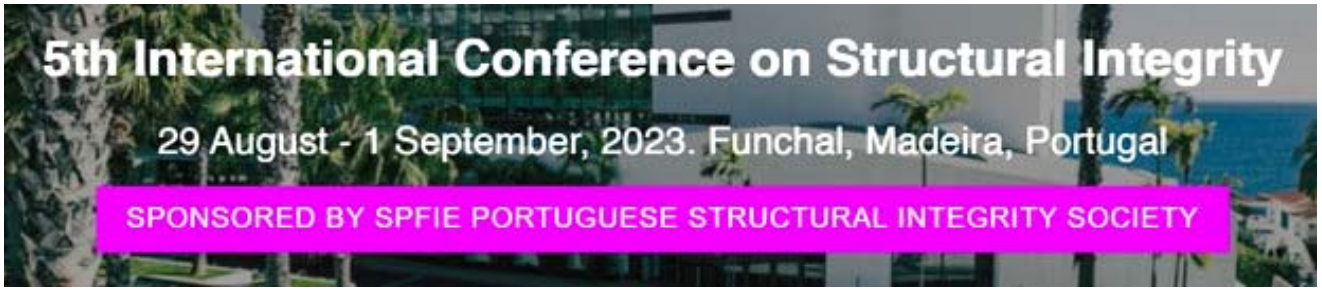
Technical Committee TC21 "Hydrogen embrittlement and Transport" of the European Structural Integrity Society – **ESIS** (https://sites.google.com/structuralintegrity.eu/tc21), and Prof. Frank Cheng (see page 18 for more details about ESIS TC21)

within the framework of the 5th International Conference on Structural Integrity **(ICSI 2023)**, 29 August – 1 September 2023. Funchal, Madeira, Portugal
https://www.icsi.pt/

VidaMar Resort Hotel,
29th – 31st August (Tuesday - Thursday), Room Sunset

Timetable, TC21 "Hydrogen Embrittlement" Symposium, Room Sunset

Tuesday, 29th August	Wednesday, 30th August	Thursday, 31st August
Session 1A **10:50 - 12:40 h**	**Session 4A** **10:50 - 12:40 h**	**Session 7A** **11:10 - 12:40 h**
Session 2A **14:00 - 15:30 h**	**Session 5A** **14:00 - 15:30 h**	**Session 8A** **14:00 - 14:45 h**
		Round table with panel discussion **14:45 - 15:30 h**
Session 3A **16:00 - 17:45 h**	**Session 6A** **16:00 - 17:30 h**	



Thematic Symposium with a round table and panel discussion

TC21 "Hydrogen Embrittlement" Symposium

Hydrogen embrittlement of metals: Problems and solutions

- **We aim** to bring together top scientists and researchers in the field of hydrogen embrittlement to present the latest achievements, the current state of the art, and the future research framework for a better understanding of hydrogen embrittlement phenomena.
- **The main objective** is to enable open and productive dialogue between all disciplines which study hydrogen embrittlement phenomena from any scientific or technological perspective and which in turn are being transformed by continuous advances in materials science and materials engineering.
- **The idea** is to attract top researchers in hydrogen embrittlement to participate with papers and to join the Thematic/Special Symposium with a round table and panel discussion on various related topics.
- **The main topics:**

- Hydrogen-materials interactions;
- Hydrogen-deformation interactions;
- Hydrogen embrittlement (HE) mechanisms;
- Hydrogen embrittlement and fatigue;
- Hydrogen mapping and novel critical experiments;
- Materials mechanical response at different scales, HE-resistant alloys;
- Multiscale, computational, and atomistic modeling of hydrogen embrittlement;
- Oil and gas pipelines transporting hydrogen-gas mixture: HE and HE-assisted fatigue;
- Hydrogen embrittlement and damage - industrial case studies (HE, HIC, HSC, HTHA,..).

Organizing committee, TC21 "Hydrogen Embrittlement" symposium:

- Professor **Milos B. Djukic** (mdjukic@mas.bg.ac.rs), University of Belgrade, Faculty of Mechanical Engineering, Serbia
- Professor **Frank Cheng** (fcheng@ucalgary.ca), University of Calgary, Schulich School of Engineering, Canada
- **Motomichi Koyama**, Associate Professor (koyama@imr.tohoku.ac.jp), Tohoku University, Japan
- **Tom Depover**, Assistant Professor (Tom.Depover@UGent.be), University of Ghent, Belgium
- Dr. **Antonio Alvaro** (antonio.alvaro@sintef.no) SINTEF, Norwegian University of Science and Technology (NTNU), Norway
- **Emilio Martínez Pañeda,** Senior Lecturer (Associate Professor) (e.martinez-paneda@imperial.ac.uk), Imperial College London, Faculty of Engineering, UK

For more details and news about TC21 "Hydrogen Embrittlement" please check here: https://www.icsi.pt/thematic-symposia-2023/

Timetable, TC21 "Hydrogen Embrittlement" (HE Special Symposium)

29th - 31st August (Tuesday - Thursday),

Room Sunset

Tuesday, 29th August		Wednesday, 30th August		Thursday, 31st August	
Session 1A (Room Sunset) **10:50 - 12:40 h** *See page 4, Paper No.*		**Session 4A** (Room Sunset) **10:50 - 12:40 h** *See page 7, Paper No.*		**Session 7A** (Room Sunset) **11:10 - 12:40 h** *See page 10, Paper No.*	
1A.1	**030 Invited talk**	**4A.1**	**192 Invited talk**	**7A.1**	**029 Invited talk**
1A.2	**152 Invited talk**	4A.2	187	7A.2	050
1A.3	**019 Invited talk**	4A.3	149	7A.3	106
1A.4	095	4A.4	124	7A.4	053
1A.5	008	4A.5	088	7A.5	049
		4A.6	103	7A.6	066
		4A.7	148		
Session 2A (Room Sunset) **14:00 - 15:30 h** *See page 5, Paper No.*		**Session 5A** (Room Sunset) **14:00 - 15:30 h** *See page 8, Paper No.*		**Session 8A** (Room Sunset) **14:00 - 14:45 h** *See page 11, Paper No.*	
2A.1	**139 Invited talk**	**5A.1**	**080 Invited talk**	8A.1	130
2A.2	062	5A.2	032	8A.2	189
2A.3	076	5A.3	038	8A.3	195
2A.4	077	5A.4	014	**Round table with a panel discussion** **14:45 - 15:30 h** *See page 11 for more details.*	
2A.5	081	5A.5	067		
2A.6	082	5A.6	065		
Session 3A (Room Sunset) **16:00 - 17:45 h** *See page 6, Paper No.*		**Session 6A** (Room Sunset) **16:00 - 17:30 h** *See page 9, Paper No.*			
3A.1	**052 Invited talk**	**6A.1**	**028 Invited talk**		
3A.2	087	6A.2	112		
3A.3	079	6A.3	115		
3A.4	075	6A.4	117		
3A.5	045	6A.5	111		
3A.6	089				

Session 1A

Tuesday, 29th August (Room Sunset), 10:50 - 12:40 h

Session		**1A** (Room Sunset), 10:50 - 12:40 h **Multiscale modeling of hydrogen embrittlement**
Chair		Jun Song, Milos B. Djukic, S. Kovacevic, Dejan Zagorac
1A.1	**10.50 – 11.10**	**Invited talk:** **Multiscale Modeling of Hydrogen Clustering and Bubbling in BCC Metals** ***Jun Song*** **030**
1A.2	**11.10 – 11.30**	**Invited talk:** **Theoretical investigations and QM modelling of hydrogen-based materials** ***Dejan Zagorac****, Jelena Zagorac, Milos B. Djukic, Tamara Škundrić, Milan Pejić, Burak Bal, Christian J. Schön* **152**
1A.3	**11.30 – 11.50**	**Invited talk:** **Phase-field modelling of environmentally induced damage** ***S. Kovacevic****, M. Makuch, E. Martinez-Paneda* **019**
1A.4	11.50 – 12.05	First-principles study on the hydrogen absorption energy in Fe-Cr-Ni austenitic systems: Effect of Cr and Ni content *Junichiro Moriyama, Osamu Takakuwa, Masatake Yamaguchi, Yuhei Ogawa, Kaneaki Tsuzaki* 095
1A.5	12.05 – 12.20	Modelling fatigue life and hydrogen embrittlement of bcc steel with unified mechanics theory *Hsiao Wei Lee, Milos B. Djukic, Cemal Basaran* 008

Session 2A

Tuesday, 29th August (Room Sunset), 14:00 - 15:30 h

Session		**2A** (Room Sunset), 14:00 - 15:30 h **Hydrogen embrittlement in pipeline steels**
Chair		Frank Cheng, Tom Depover, Antonio Alvaro, Osamu Takakuwa Milos B. Djukic
2A.1	**14.00 – 14.20**	**Invited talk:** **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** *Qing Hu,* ***Frank Cheng*** **139**
2A.2	14.20 – 14.35	Evaluation of the tensile properties of X65 pipeline steel in compressed gaseous hydrogen using hollow specimens *Alessandro Campari, Florian Konert, Jonathan Nietzke, Oded Sobol, Nicola Paltrinieri, Antonio Alvaro* 062
2A.3	14.35 – 14.50	Hydrogen embrittlement determination of L485MB pipeline steel and its heat affected zone via notched tensile tests *Laura De Pue, R. Jubica, Lisa Claeys, Somsubhro Chaudhuri, Tom Depover, Wim De Waele, Kim Verbeken, Stijn Hertelé* 076
2A.4	14.50 – 15.05	Hydrogen-assisted degradation of an X70 pipeline steel evaluated by single edge notched tension testing *Margo Cauwels, Robin Depraetere, Wim De Waele, Stijn Hertelé, Tom Depover, Kim Verbeken* 077
2A.5	15.05 – 15.20	The effect of austenitizing temperature on the hydrogen embrittlement of API 5L X100 pipeline steel *Reza Khatib Zadeh Davani, Ehsan Entezari, Sandeep Yadav, Jhon Freddy Aceros Cabezas, Jerzy Szpunar* 081
2A.6	15.20 – 15.35	Crack growth resistance of actual pipe welds exposed to hydrogen and natural gas mixture and pure hydrogen under high pressure *Guillaume Benoit, Denis Bertheau, Gilbert Henaff, Laurent Alvarez* 082

Session 3A

Tuesday, 29th August (Room Sunset), 16:00 - 17:45 h

Session		**3A** (Room Sunset), 16:00 - 17:45 h **Hydrogen embrittlement in metallic materials: Experiments, and assessment**
Chair		Tom Depover, Jun Song, Dejan Zagorac, Osamu Takakuwa, Milos B Djukic
3A.1	**16.00 – 16.20**	**Invited talk:** **Hydrogen-accelerated/decelerated fatigue crack propagation in Ni-based superalloy 718** ***Osamu Takakuwa***, *Yuhei Ogawa* 052
3A.2	16.20 – 16.35	Effect of Nickel on the hydrogen embrittlement, diffusion, and trapping properties of ferritic-martensitic dual-phase low alloy steel in tempered condition *Esteban Rodoni, Tom Depover, Kim Verbeken, Mariano Iannuzzi* 087
3A.3	16.35 – 16.50	Hydrogen interaction with an equiatomic CoCrFeMnNi high entropy alloy *Lisa Claeys, Hauke Springer, MohammadhosseinBarati Rizi, Kim Verbeken, Tom Depover* 079
3A.4	16.50 – 17.05	Advances in Quantitative Hydrogen Embrittlement Assessment *Joshua Jackson, Craig Tod, Milos B. Djukic, Bryan Fahimi* 075
3A.5	17.05 – 17.20	Hydrogen-assisted fatigue crack propagation in ferritic iron: An overview of macroscale behavior and microscale mechanisms Yuhei Ogawa, Osamu Takakuwa 045
3A.6	17.20 – 17.35	A Comparison Study on Environmental Effects of Natural and Synthetic Fiber Reinforced Polymer Composite (NFRPC) for their Potential Application *Dillip Kumar Bisoyi, Chinmayee Dash* 089

Session 4A

Wednesday, 30th August (Room Sunset), 10:50 - 12:40 h

Session		**4A** (Room Sunset), 10:50 - 12:40 h **Hydrogen embrittlement mechanisms**
Chair		Milos B. Djukic, Tom Depover, Masoud Moshtaghi, Yuhei Ogawa, Burak Bal
4A.1	**10.50 – 11.10**	**Invited talk:** **Recent developments in understanding the mechanisms of hydrogen embrittlement and trapping behaviour in Al alloys** ***Masoud Moshtaghi*** **192**
4A.2	11.10 – 11.25	The HELP+HEDE model for hydrogen embrittlement in metals: New insights and experimental/modeling confirmations *Milos B. Djukic, Jovana Perisic, Muhammad Wasim, Gordana Bakic, Aleksandar Sedmak, Bratislav Rajicic* 187
4A.3	11.25 – 11.40	Investigations of the hydrogen–defect interactions by Molecular Dynamics *Mehmet Fazil Kapci, Burak Bal* 149
4A.4	11.40 – 11.55	A study of the effects of hydrogen on martensitic advanced high-strength steels *Carlo Maria Belardini, Giuseppe Macoretta, Marco Beghini, Leonardo Bertini, Bernardo Disma Monelli, Renzo Valentini* 124
4A.5	11.55 – 12.10	Definition of a test-independent hydrogen embrittlement index for advanced high-strength steels *Giuseppe Macoretta, Carlo Maria Belardini, Marco Beghini, Bernardo Disma Monelli, Renzo Valentini* 088
4A.6	12.10 – 12.25	Hydrogen Interaction with Dislocations in Relation to Hydrogen Embrittlement of Metals *V.G. Gavriljuk, V.M. Shyvaniuk, S.M. Teus* 103
4A.7	12.25 – 12.40	Effect of Strain Rate and Hydrogen on The Mechanical Behaviors of Aluminum Alloys *Mehmet Furkan Baltacıoğlu, Burak Bal* 148

Session 5A

Wednesday, 30th August (Room Sunset), 14:00 - 15:30 h

Session		**5A** (Room Sunset), 14:00 - 15:30 h **Hydrogen embrittlement in steels, part I**
Chair		Tom Depover, Masoud Moshtaghi, Margo Cauwels, Esteban Rodoni
5A.1	**14.00 – 14.20**	**Invited talk:** **Increasing the resistance to hydrogen embrittlement of martensitic medium carbon steels** *Margot Pinson, Kim Verbeken,* ***Tom Depover*** **080**
5A.2	14.20 – 14.35	Influence of Mo content on susceptibility of medium carbon martensitic steels to hydrogen embrittlement *Magdalena Eškinja, Gerald Winter, Jürgen Klarner, Holger Schnideritsch, Gregor Mori, Masoud Moshtaghi* 032
5A.3	14.35 – 14.50	Role of prior austenite grain structure in hydrogen diffusion, trapping and embrittlement mechanisms in as-quenched martensitic steels *Renata Latypova, Eric Fangnon, Olli Nousiainen, Sakari Pallaspuro, Jukka Kömi* 038
5A.4	14.50 – 15.05	Hydrogen effects in high-strength lath martensite steel bars for structural engineering *Mihaela Iordachescu, Patricia Santos, Andres Valiente* 014
5A.5	15.05 – 15.20	Evaluating hydrogen embrittlement susceptibility of a duplex stainless steel *L.B. Peral, A. Díaz, C. Rodríguez, J.M. Alegre, I.I. Cuesta* 067
5A.6	15.20 – 15.35	Comparison of hydrogen embrittlement susceptibility of martensitic stainless steel subjected to conventional and cryogenic heat treatment *Mirjam Bajt Leban, Bojan Zajec, Bojan Podgornik, Tadeja Kosec* 065

Session 6A

Wednesday, 30th August (Room Sunset), 16:00 - 17:30 h

Session		**6A** (Room Sunset), 16:00 - 17:30 h **Hydrogen embrittlement in steels, part II**
Chair		Frank Cheng, Akihiko Fukunaga, Guillermo Álvarez, Tom Depover
6A.1	**16.00 – 16.20**	**Invited talk:** **Hydrogen embrittlement behavior of iron-based superalloy A286** ***Akihiko Fukunaga*** **028**
6A.2	16.20 – 16.35	Hydrogen embrittlement in a 2205 duplex stainless steel plate: Influence of specimen orientation *V. Arniella, J. Belzunce, C. Rodríguez* 112
6A.3	16.35 – 16.50	Hydrogen embrittlement resistance of additively manufactured SS316L: Effects of post-treatments and testing conditions *G. Álvarez, Z. Harris, K. Wada, C. Rodríguez, E. Martínez-Pañeda,* 115
6A.4	16.50 – 17.05	Hydrogen embrittlement of tempered S41500 martensitic stainless steel *D. Harandizadeh Najafabadi, D. Thibault, M. Brochu* 117
6A.5	17.05 – 17.20	Post-mortem estimation of hydrogen embrittlement threshold on sustained-load test coupons using fractography and statistics of extreme values *Simon Laliberté-Riverin, Jonathan Bellemare, Frédéric Sirois, Myriam Brochu* 111

Session 7A

Thursday, 31st August (Room Sunset), 11:10 - 12:40 h

Session		**7A** (Room Sunset), 11:10 - 12:40 h **Hydrogen embrittlement in steels, part III**
Chair		Lisa Claeys, Liese Vandewalle, Birhan Sefer, Masoud Moshtaghi, Milos B. Djukic
7A.1	**11.10 – 11.30**	**Invited online talk:** **Characteristics of local plasticity and boundary character in hydrogen-assisted intergranular and intergranular-like fracture paths** ***M. Koyama,*** *T. Chen, T. Chiba, K. Takai* **029**
7A.2	11.30 – 11.45	Damage evolution investigation of two hydrogen-charged pipeline steels using X-ray micro-CT *Robin Depraetere, Wim De Waele, Margo Cauwels, Tom Depover, Kim Verbeken, Stijn Hertelé* 050
7A.3	11.45 – 12.00	Comparative study of hydrogen uptake in low alloyed carbon and austenitic stainless steels under cathodic hydrogen charging in aqueous electrolyte and gaseous hydrogen charging *Daria Pałgan, Markus Uhlirsch, Nuria Fuertes, Birhan Sefer* 106
7A.4	12.00 – 12.15	Study of hydrogen trapping at carbides after gaseous charging at elevated temperatures and its impact on mechanical properties *Liese Vandewalle, Tom Depover, Kim Verbeken* 053
7A.5	12.15 – 12.30	Hydrogen trapping at micro/nano-sized secondary hardening precipitates *Stefanie Pichler, Gregor Mori, Mahdieh Safyari, Masoud Moshtaghi* 049
7A.6	12.30 – 12.45	Fatigue fracture in advanced ultrahigh-strength steels tested under gaseous hydrogen charging *Supriya Nandy, Sakari Pallaspuro, Pekka Moilanen, Renata Latypova, Janne Pakarinen, Jukka Kömi, Elina Huttunen-Saarivirta* 066

Session 8A

Thursday, 31st August (Room Sunset), 14:00 - 14:45 h

Session		**8A** (Room Sunset), 14:10 - 14:45 h **Hydrogen damage and corrosion, industrial cases**
Chair		Tom Depover, Jun Song, Masoud Moshtaghi, Dejan Zagorac, Milos B. Djukic
8A.1	14.00 – 14.15	The critical expansion strain for the onset of structural integrity degradation due to high-temperature hydrogen attack of a carbon manganese steel *R.J. Mostert, A van Zyl, C.C.E. Pretorius, V.M Mathoho* 130
8A.2	14.15 – 14.30	Effect of seawater corrosion on the mechanical behavior of S690 steel *Ana Dantas, Rita Dantas, Gonçalo P. Cipriano, Abílio de Jesus, Grzegorz Lesiuk, Carlos Fonseca, Pedro Moreira, José A.F.O. Correia* 189
8A.3	14.30 – 14.45	The role of hydrogen in the corrosion-induced reduction of plane-stress fracture toughness and strain-induced intergranular cracking of AA2024 *C.C.E. Pretorius, R.J. Mostert, C-M.Charalampidou, N.D. Alexopoulos* 195

Round table with a panel discussion

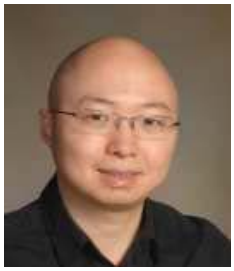
Thursday, 31st August (Room Sunset), 14:45 - 15:30 h, after session 8A, from 14:45 - 15:30 h

Session	**TC21 "Hydrogen Embrittlement" - Round table and panel discussion, 14:45 - 15:30 h**
Room	Sunset
Chair	Frank Cheng, Tom Depover, Antonio Alvaro, Motomichi Koyama, E. Martínez Pañeda, Milos B. Djukic
Opening **14:45 – 14.50**	**Introduction –** Opening of the session TC10B Round table with a panel discussion
Round table 1	
Topic 1 or Presentation **14.50 – 15.05**	**Hydrogen embrittlement of metals: Problems and solutions**
Panel discussion 1 **15.05 – 15.25**	
Closing **15.25 – 15.30**	**Closing of the TC21 "Hydrogen Embrittlement" Symposium** and Round table with a panel discussion

TC21 "Hydrogen Embrittlement", Invited speakers (1)

Session 1A (Room Sunset), Tuesday, 29th August, 10:50 - 12:40 h (see page 4)

Jun Song, Associate Professor, McGill University, Department of Mining and Materials Engineering, Montreal, Quebec, Canada



Jun Song

Multiscale Modeling of Hydrogen Clustering and Bubbling in BCC Metals

Session 1A, **Tuesday, 29th**, Room Sunset, **10.50 -11.10 h** **030**

More about Jun Song, Associate Professor: https://www.mcgill.ca/engineering/jun-song

Session 1A (Room Sunset), Tuesday, 29th August, 10:50 - 12:40 h (see page 4)

Dr. rer. nat. Dejan Zagorac, Research Associate Professor, Institute of Nuclear Sciences "Vinča", University of Belgrade, Belgrade, Serbia

Dejan Zagorac, Jelena Zagorac, Milos B. Djukic, Tamara Škundrić, Milan Pejić, Burak Bal, Christian J. Schön

Theoretical investigations and QM modelling of hydrogen-based materials

Session 1A, **Tuesday, 29th**, Room Sunset, **11.10 -11.30 h** **152**

More about Dr. rer. nat. Dejan Zagorac: http://el-tim.edu.rs/dr-rer-nat-dejan-zagorac/

Session 1A (Room Sunset), Tuesday, 29th August, 10:50 - 12:40 h (see page 4)

Dr. Sasa Kovacevic, Research Associate, Imperial College, Department of Civil and Environmental Engineering, London, UK

S. Kovacevic, M. Makuch, E. Martinez-Paneda

Phase-field modelling of environmentally induced damage

Session 1A, **Tuesday, 29th**, Room Sunset, **11.30 -11.50 h** **019**

More about Dr. Sasa Kovacevic: https://www.imperial.ac.uk/mechanics-materials/people/

Session 2A (Room Sunset), Tuesday, 29th August, 14:00 - 15:30 h (see page 5)

Professor Franck Cheng, University of Calgary, Schulich School of Engineering, Canada

Qing Hu**, Franck Cheng**

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

Session 2A, **Tuesday, 29th**, Room Sunset, **14.00 - 14.20 h** **139**

More about Professor Franck Cheng: https://profiles.ucalgary.ca/frank-cheng

TC21 "Hydrogen Embrittlement", Invited speakers (2)

Session 3A (Room Sunset), Tuesday, 29th August, 16:00 - 17:45 h (see page 6)

Osamu Takakuwa, **Associate Professor**, Kyushu University, Department of Mechanical Engineering, Fukuoka, Japan

Osamu Takakuwa, Yuhei Ogawa

Hydrogen-accelerated/decelerated fatigue crack propagation in Ni-based superalloy 718

Session 3A, **Tuesday, 29th**, Room Sunset, **16.00 - 16.20 h** **052**

More about Osamu Takakuwa, Associate Professor: https://hyoka.ofc.kyushu-u.ac.jp/search/details/K006497/english.html

Session 4A (Room Sunset), Wednesday, 30th August, 10:50 - 12:40 h (see page 7)

Dr. Masoud Moshtaghi, Senior Scientist, Chair of General and Analytical Chemistry Montanuniversität Leoben, Leoben, Austria

Masoud Moshtaghi

Recent developments in understanding the mechanisms of hydrogen embrittlement and trapping behaviour in Al alloys

Session 4A, **Wednesday, 30th**, Room Sunset, **10.50 - 11.10 h** **192**

More about Dr. Masoud Moshtaghi: https://pure.unileoben.ac.at/en/persons/masoud-moshtaghi

Session 5A (Room Sunset), Wednesday, 30th August, 14:00 - 15:30 h (see page 8)

Tom Depover, **Assistant Professor**, Ghent University, Department of Materials, Textiles and Chemical Engineering, Sustainable Materials Science, Ghent, Belgium

Margot Pinson, Kim Verbeken, **Tom Depover**

Increasing the resistance to hydrogen embrittlement of martensitic medium carbon steels

Session 5A, **Wednesday, 30th**, Room Sunset, **14.00 – 14.20 h** **080**

More about Tom Depover, Assistant Professor: https://biblio.ugent.be/person/802001111896

Session 6A (Room Sunset), Wednesday, 30th August, 16:00 - 17:30 h (see page 9)

Professor Akihiko Fukunaga, Waseda University, Department of Applied Chemistry, Tokyo, Japan

Akihiko Fukunaga

Hydrogen embrittlement behavior of iron-based superalloy A286

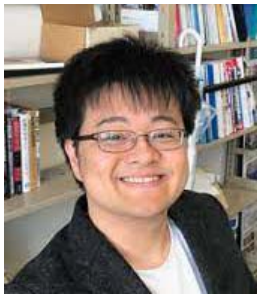
Session 6A, **Wednesday, 30th**, Room Sunset**, 16.00 - 16.20 h** **028**

More about Professor Akihiko Fukunaga: https://waseda.elsevierpure.com/en/persons/akihiko-fukunaga

TC21 "Hydrogen Embrittlement", Invited speakers (3)

Session 7A (Room Sunset), Thursday, 31st August, 11:10 - 12:40 h (see page 10)

Motomichi Koyama, **Associate Professor**, Institute for Materials Research, Tohoku University, Aobaku, Sendai, Miyagi, Japan



M. Koyama, T. Chen, T. Chiba, K. Takai

Online talk:
Characteristics of local plasticity and boundary character in hydrogen-assisted intergranular and intergranular-like fracture paths

Session 7A, **Thursday, 31st**, Room Sunset, **11.10 - 11.30 h** **029**

More about Motomichi Koyama, Associate Professor:
https://akiyamaimr-e.amebaownd.com/pages/2099284/page_201807171934

ICSI2023 Plenary Lecture by Professor Franck Cheng

Co-chair of the TC21 Thematic/Special "Hydrogen Embrittlement" Symposium with a round table and panel discussion

Professor Franck Cheng, University of Calgary, Schulich School of Engineering, Canada

Franck Cheng

Fundamental insights into the hydrogen embrittlement of pipelines in high-pressure gaseous environments

Plenary Lecture I, Tuesday, 29th August, Room Sunset, 09:30 - 10:15 h

Dr. Frank Cheng is a Professor and Canada Research Chair in Pipeline Engineering at the University of Calgary. Frank is an internationally recognized leader in Energy Pipeline Technology, with specializations in pipeline corrosion and stress corrosion cracking, hydrogen pipeline technology and defect assessment for structural integrity management.

Frank is the author of 4 books and over 280 peer-reviewed journal papers. The total citations of his publications exceed 14,700, with a H-index of 73. Frank's research excellence was recognized and evidenced by many prestigious awards. He was named the Canadian Distinguished Materials Scientist in 2019. Frank is elected Fellow of the U.S. National Association of Corrosion Engineers (NACE), the U.K. Institute of Metallurgy, Mining and Minerals (IOM3), the U.K. Institute of Corrosion (ICorrr), the International Association of Advanced Materials (IAAM) and the Chinese Society for Corrosion Protection (CSCP).

Frank serves as the Editor-in-Chief of the Journal of Pipeline Science and Engineering. Frank obtained his Ph.D. in Materials Engineering at the University of Alberta in 2000.

More about Professor Franck Cheng: https://profiles.ucalgary.ca/frank-cheng

ICSI2023 Plenary Lecture by Dr. Dejan Zagorac, Research Associate Professor

Invited speaker of the TC21 Thematic/Special "Hydrogen Embrittlement" Symposium with a round table and panel discussion

Dr. rer. nat. Dejan Zagorac, Research Associate Professor, Institute of Nuclear Sciences "Vinča", University of Belgrade, Belgrade, Serbia

Dejan Zagorac

Advanced materials under extreme conditions: Structure prediction, structure-property relationship and mechanical properties

Plenary Lecture IV, Thursday, 31st August, Room Sunset, 10:05 - 10:40 h

Dr. Dejan Zagorac is a Research Associate Professor at the Department of Materials Science, Institute of Nuclear Sciences "Vinča", Serbia, and Head of the Laboratory for Theoretical Investigation of Materials (L-TIM) at the Center of Excellence – Cextreme Lab. After receiving his M.Sc. title at the University of Belgrade (2007), he started to work on his Ph.D. thesis at the Max-Plank Institute for Solid State Research (FKF) in Stuttgart, Germany (2008-2012). He received his doctorate in 2012 at the University of Stuttgart, which was completed jointly with MPI-FKF, Stuttgart. Afterward, he continued his post-doctoral studies at the MPI-FKF in Stuttgart (2013), and at the Theoretical Chemistry Department, University of Erlangen-Nurnberg (FAU), Erlangen, Germany (2014). Since 2015, he has started to work at the Institute of Nuclear Sciences "Vinča", Serbia, and was one of the founders of a Center of Excellence where he is the Head of the L-TIM.

He is engaged in research related to theoretical investigations of new materials and properties, with a special focus on theoretical modeling of advanced materials applicable at extreme conditions. He published over 100 papers in his scientific career, with over 40 scientific papers in international journals from the SCI list and two book chapters published by Elsevier and Springer. He was invited and a plenary speaker at international and domestic conferences and universities, a reviewer in international and domestic journals and books, a member of the organizing committee of the conferences, and an Editor in Chief in an international publishing house. He is a member of international and domestic scientific associations and he is the Editor of the Journal of Innovative Materials in Extreme Conditions. He was engaged in the preparation of M.Sc. and Ph.D. theses and was an external member of the international Ph.D. committees. He has led and participated in international (Horizon 2020, etc) and domestic research projects.

More about Dr. rer. nat. Dejan Zagorac, Research Associate Professor:
http://el-tim.edu.rs/dr-rer-nat-dejan-zagorac/

Announcement –
The Special Issue (SI) of the Engineering Failure Analysis
Thematic Symposium TC21 "Hydrogen Embrittlement", ICSI2023

A selection of papers presented at this Thematic Symposium will be invited for publication in a **Special Issue (SI)** of the **Engineering Failure Analysis (EFA)** journal by Elsevier (2022: CiteScore 6.3, Impact Factor 4).

The SI will also include the selected and invited papers presented at the Thematic/Special Symposium with a round table and panel discussion – TC21 "Hydrogen Embrittlement", ICSI2023.

The title of the Special Issue (SI) in Engineering Failure Analysis (EFA) is:

"Understanding Environmentally Hydrogen Assisted Cracking of Metals: Key Towards a Sustainable Future"

The SI Guest Editors are:

- Tom Depover (Tom.Depover@ugent.be), Ghent University, Ghent, Belgium
- May Martin, National Institute of Standards and Technology (NIST), Boulder, Colorado, United States of America
- Hisao Matsunaga, Kyushu University, Fukuoka, Japan
- Milos B. Djukic, University of Belgrade, Faculty of Mechanical Engineering, Serbia

The selected authors of papers presented at the Thematic Symposium TC21 "Hydrogen Embrittlement", during ICSI2023, will be invited by the SI Guest Editors to submit the full papers for publication in the SI of EFA.

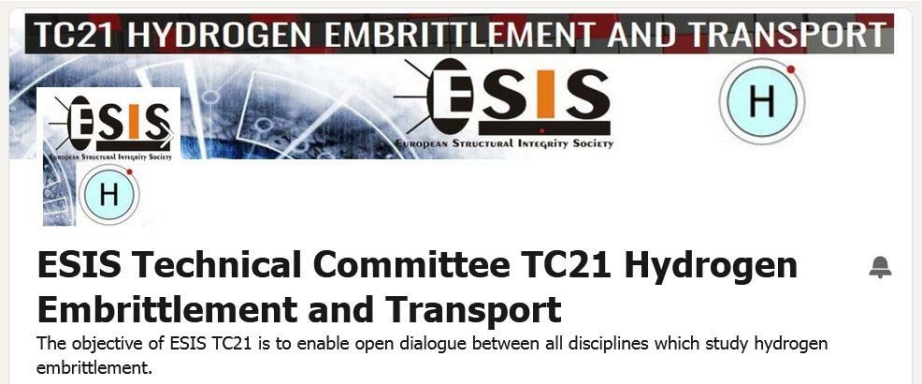
The decision will be made by TC21 "Hydrogen Embrittlement" symposium organizers and the SI Guest Editors after the ICSI2023 conference. The selected authors will be informed and invited by email.

The mandatory requirement is: The content of the full paper for the SI must contain more than 50% new stuff to be accepted in comparison to the original research contribution – a short version paper published in the ICSI2023 proceedings: "Procedia Structural Integrity" journal (see below). The extended full paper for the SI could have a completely different title It is the editors' decision on whether or not the extended content is sufficient. Authors should submit their conference papers as supplementary documents. Invited papers submitted to the SI will go through a rigorous peer-review process with the same standard as regular submissions.

The ICSI2023 conference proceedings will be published with open access in Elsevier's "Procedia Structural Integrity" journal.

Authors are encouraged to submit a full conference paper of 6-8 pages. Reviewed and accepted conference papers will be published in a dedicated issue in Elsevier's "Procedia Structural Integrity" and made available in open access at http://www.journals.elsevier.com/procedia-structural-integrity/.

Your paper should be submitted by September 30, 2023, at the latest. Use the following email icsi@icsi.pt. Please note that your full manuscript should abide by the full paper template and follow the paper preparation guidelines, available at the ICSI2023 website.



TC21 "Hydrogen Embrittlement" Symposium is organized and supported by

Technical Committee TC21 "Hydrogen embrittlement and Transport" (https://sites.google.com/structuralintegrity.eu/tc21) of the **European Structural Integrity Society – ESIS** (https://www.structuralintegrity.eu/), and Prof. Frank Cheng

ESIS TC21 "Hydrogen Embrittlement and Transport", Chair:
- Prof. Milos B. Djukic
- Prof. Dr. Ir. Tom Depover
- Dr. Antonio ALVARO
- Dr. Emilio Martínez Pañeda, Ph.D., Senior Lecturer (Associate Professor)
- Dr. Eng. Motomichi Koyama, Associate Professor

ESIS TC21 aim is to bring together top scientists and researchers in the field of hydrogen embrittlement of structural materials, hydrogen technology, and hydrogen transport to present the latest achievements, the current state of the art, and the future research framework for a better understanding of hydrogen embrittlement phenomena and complex hydrogen-material interactions.

Links:
- **ESIS TC21 LinkedIn (LI) page**: https://www.linkedin.com/showcase/esis-technical-committees-tc21-hydrogen-embrittlement-and-transport/
- **ESIS LI page**: https://www.linkedin.com/company/european-structural-integrity-society/
- **Hydrogen Embrittlement LI Group** (4000+ followers): https://www.linkedin.com/groups/4991909/
- **Hydrogen Embrittlement LI Newsletter** (7000+ subscribers): https://www.linkedin.com/newsletters/6877459701664157696/

Kind regards,

Milos B. Djukic, Frank Cheng, Motomichi Koyama,
Tom Depover, Antonio Alvaro and Emilio Martínez Pañeda

Organizers of the ICSI2023 Thematic/Special Symposium with a round table and panel discussion – TC21 "Hydrogen Embrittlement", Hydrogen embrittlement of metals: Problems and solutions