

4th Swerim Hydrogen gas seminar

APRIL 1–2, 2025, SWERIM, STOCKHOLM

PROGRAMME, APRIL 1, 2025

10.30–11.00	Registration and coffee	
11.00–12.00	The complexity of hydrogen embrittlement and challenges in repurposing of natural gas pipelines for hydrogen	<i>Prof. Dr. Milos B. Djukic, University of Belgrade</i>
12.00–13.00	Lunch	
13.00–17.00	Welcome to the seminar	<i>Pontus Sjöberg, Swerim</i>
	Hydrogen in the Industrial Transformation	<i>Maria Nyqvist, Energimyndigheten</i>
	Hydrogen in LKAB: s Transformation to Net-zero Emissions	<i>Annika Carlson, LKAB</i>
	Process Plant Design for Hydrogen-based Industries	<i>Camila Varela, Stegra</i>
	Coffee break	
	Hybrit labs – Supporting the Transition to Fossil-free Steelmaking	<i>Johan Martinsson, Swerim</i>
	Pioneering the Path: How GreenIron is Proving Hydrogen's Potential Today	<i>Helén Wittesjö, Green Iron</i>
	EMPHATICAL – Methanol from Steel Off-gases	<i>Paul Cobden, Swerim</i>
	Coffee break	
	De-carbonization by using Hydrogen in Metallurgical Processes	<i>Ola Ritzén, Linde</i>
	Pioneering Hydrogen in Steel Reheating – Learnings and Insights	<i>Nicklas Magnusson, Ovako</i>
	Prof of Concept, Mixing system Energy Gases	<i>David Blecko & Björn Bergqvist, Uddeholms</i>
18.00–21.00	Dinner cruise in Stockholm archipelago with M/S Östanå	

PROGRAMME, APRIL 2, 2025

08.30–09.00	Coffee	
09.00–12.00	Compressed Hydrogen in Lined Rock Holes – New Technology	<i>Marcus Billström, H2 Hive</i>
	H₂FlexiStore – Lined Rock Shaft Hydrogen Storage Technology	<i>Jack Treveil, Gravitricity</i>
	Flexibility through Hydrogen storage – Lined Rock Cavern Technology	<i>Marie Anheden, Hybrit Development</i>
	Coffee break	
	Great Support for Hydrogen – What Happens Next	<i>Björn Santana Arvidsson, Nordion Energi</i>
	Possibilities with Co-planning of Hydrogen and Electricity	<i>Camilla Rubinstein, Svenska Kraftnät</i>
	Hydrogen in Automotive – Possibilities & Challenges	<i>Niklas Israelsson, Volvo</i>
	Hydrogen and Metal Interaction – Ongoing Research and Future Possibilities	<i>Nuria Fuertes, Swerim</i>
12.00–13.00	Lunch	
13.00–14.00	Guided Lab tour at Swerim	

DATE

April 1–2, 2025

PLACE

Swerim, Isafjordsgatan 28A, Kista

PRICE

Free of charge for member in the Arena for hydrogen in process and materials.
Non member 3500 SEK.

REGISTRATION

Please register below no later than March 23, 2025

[Link to registration ►►](#)



CONTACT

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INVITED LECTURE

Prof. Dr. Milos B. Djukic, University of Belgrade

The complexity of hydrogen embrittlement and challenges in repurposing of natural gas pipelines for hydrogen

Abstract

Component failures due to hydrogen embrittlement (HE) were observed in different industrial systems, including high-pressure hydrogen storage tanks, pipelines, high-strength alloy components, and process industry components. Numerous contemporary studies confirmed multiple activities and synergistic effects of HE mechanisms in steels and other metallic materials.

The coexistence and synergy of different HE mechanisms, including the hydrogen-enhanced localized plasticity (HELP) and the hydrogen-enhanced decohesion (HEDE), were recently formulated and confirmed as the unified HELP+HEDE model for HE in metallic materials. The HE of the natural gas pipelines repurposed for hydrogen transport can be one of the main reasons for the decline of the pipeline's reliability and integrity.

Blending hydrogen into existing natural gas pipelines and hydrogen transport is now being actively considered as part of the decarbonization strategy in Europe, and elsewhere; the key impediment is the possibility of hydrogen embrittlement and hydrogen-induced cracking of steel pipelines. The reliability assessment, structural integrity, and remaining life of corroded aged gas pipelines and new hydrogen pipelines are necessary for improved maintenance of pipelines exposed to corrosion for hydrogen transport. Therefore, it is imperative to implement a comprehensive scientific and technical assessment program for repurposing.

Milos B. Djukic

Milos B. Djukic is a full professor at the University of Belgrade, Faculty of Mechanical Engineering, Belgrade, Serbia. He is also an adjunct professor at Ohio University, Athens, OH, USA. His research interests include hydrogen embrittlement, hydrogen-materials interactions, corrosion and materials science, materials degradation, and the mechanical behavior of materials. He is the head of the Hydrogen-Materials Interaction Laboratory. He was included in the 2023 and 2024 list of the 2% most cited researchers worldwide, published by Stanford University and curated by Elsevier.



Prof. Djukic is a team member in preparation of the Hydrogen Strategy of the Republic of Serbia and an Executive Committee Member of the European Structural Integrity Society (ESIS). He is an elected Fellow (FESIS) of the ESIS. He also serves as the chair of ESIS Technical Committee TC21 on Hydrogen Embrittlement and Transport. He is an assistant subject editor for the International Journal of Hydrogen Energy by Elsevier and a member of the editorial board of 18 international journals.

With over 25 years of teaching and research experience, Dr. Djukic has published 5 books, 10 book chapters, 1 patent, 3 technical solutions, 100 peer-reviewed scientific papers, and 120 conference articles. He has contributed to more than 200 industrial studies, reviews, and expertise.

Prof. Djukic scientific research focuses on the fundamental understanding of hydrogen embrittlement mechanisms in metallic materials and hydrogen-materials interactions. He proposed the novel hydrogen embrittlement model in metallic materials based on the synergy of mechanisms. This so-called unified HELP+HEDE model for hydrogen embrittlement has been widely accepted and is highly cited with more than 900 citations.