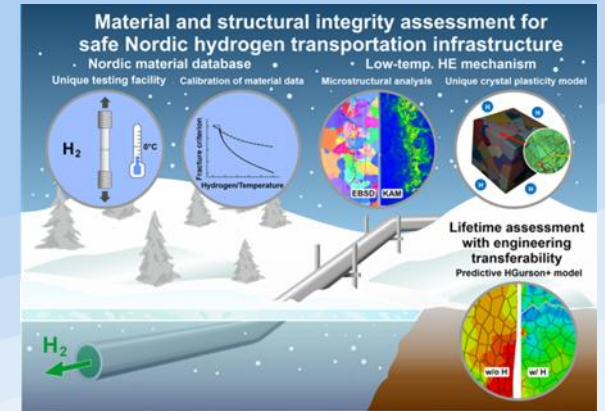


# Material and Structural Integrity Assessment for safe Nordic Hydrogen Transportation Infrastructure (MatHias)



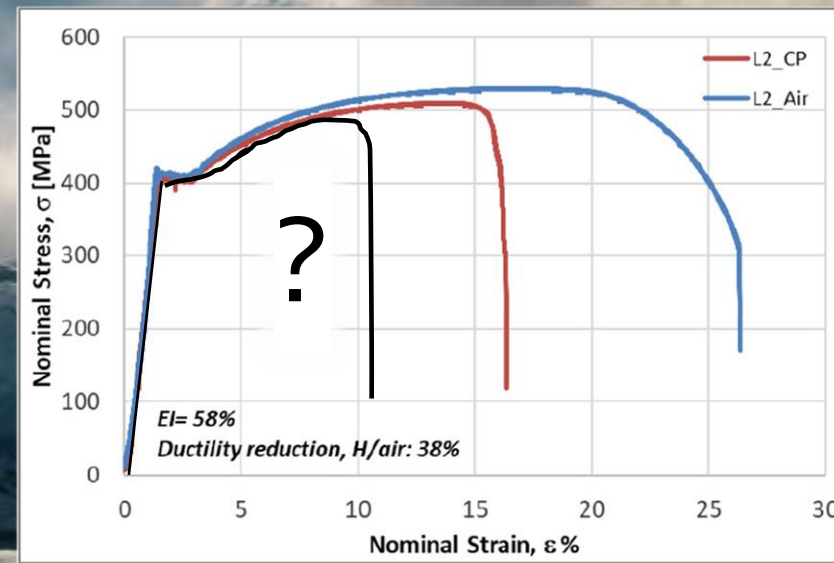
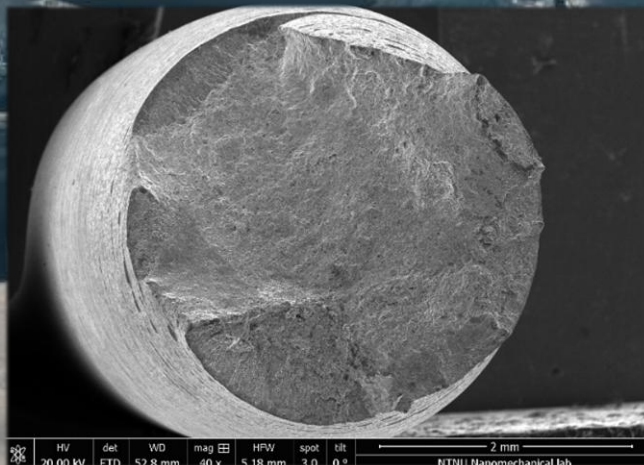


# Nordic Hydrogen Valleys as Energy Hubs



## Mathias - Material and Structural Integrity Assessment for safe Nordic Hydrogen Transportation Infrastructure





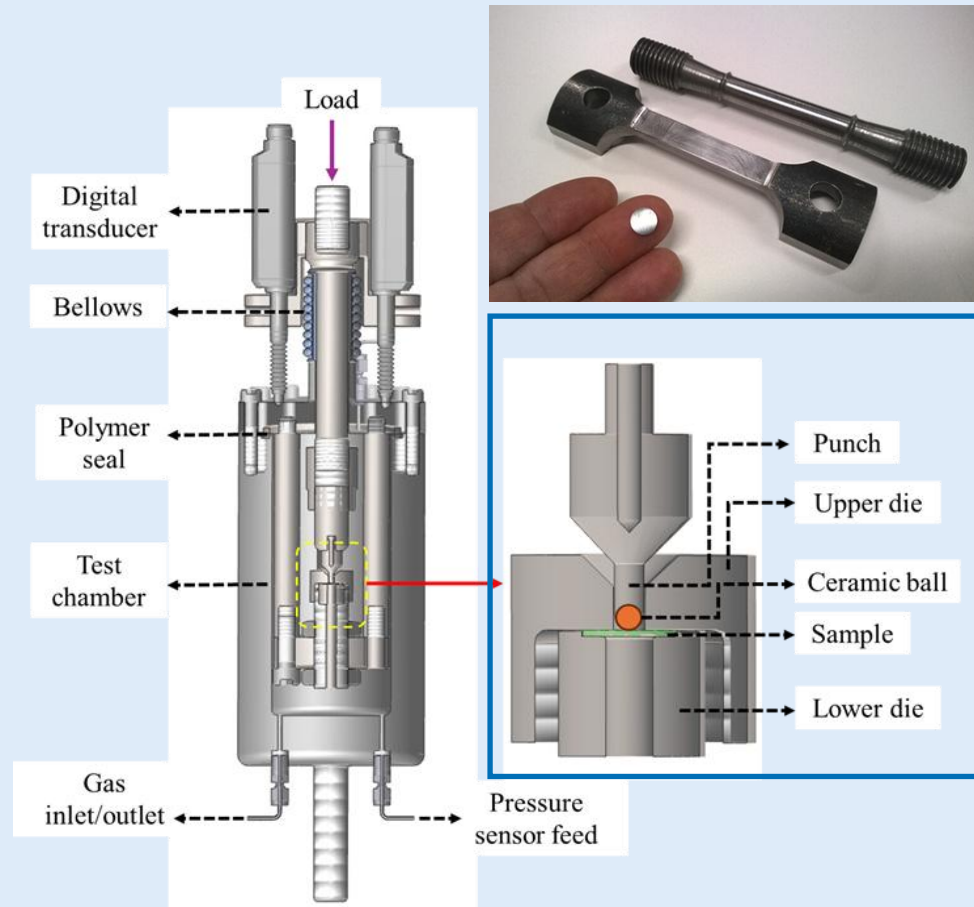
# Main message

- Materials and structural integrity is an important part of the safety in all existing and new hydrogen projects.
- This includes all infrastructure and materials that are exposed to hydrogen in the H<sub>2</sub>-value chain.
- This has implications for:
  - Materials choice
  - Design
  - Inspection
  - Life-time
  - Standardization

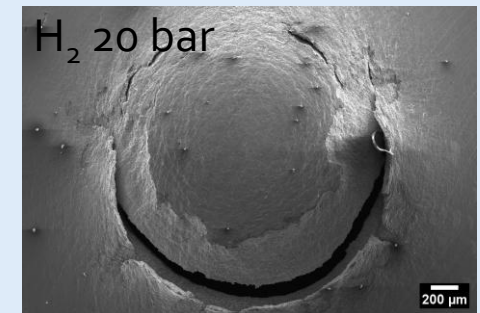
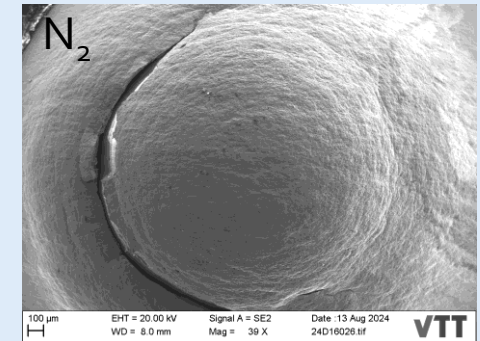
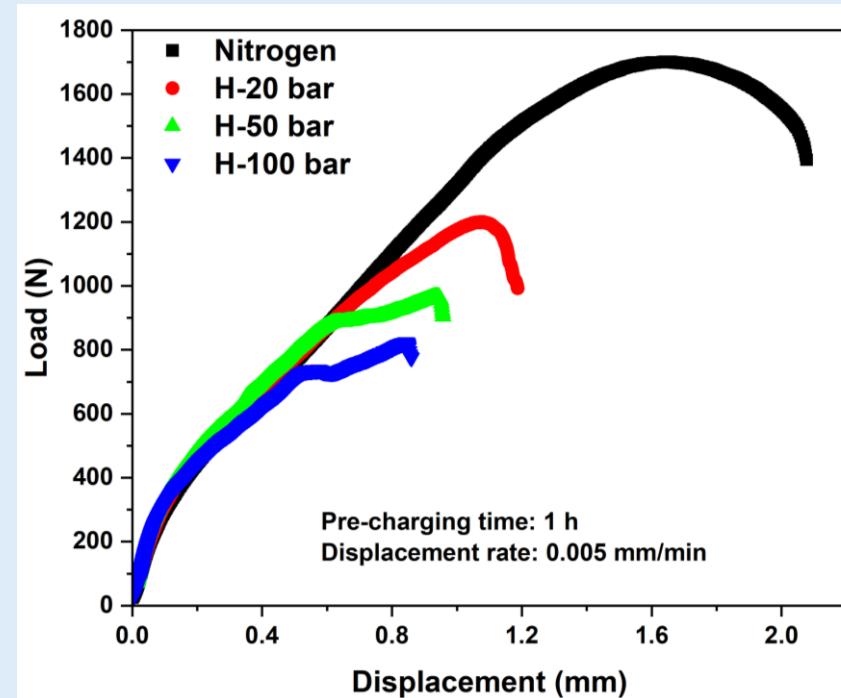
# Relevant results from the Mathias project.

# Small punch test

- Fast and safe method for screening of the compatibility of materials with gaseous H<sub>2</sub>, applied in **MatHias** to compare the performance of pipeline steels under relevant conditions.

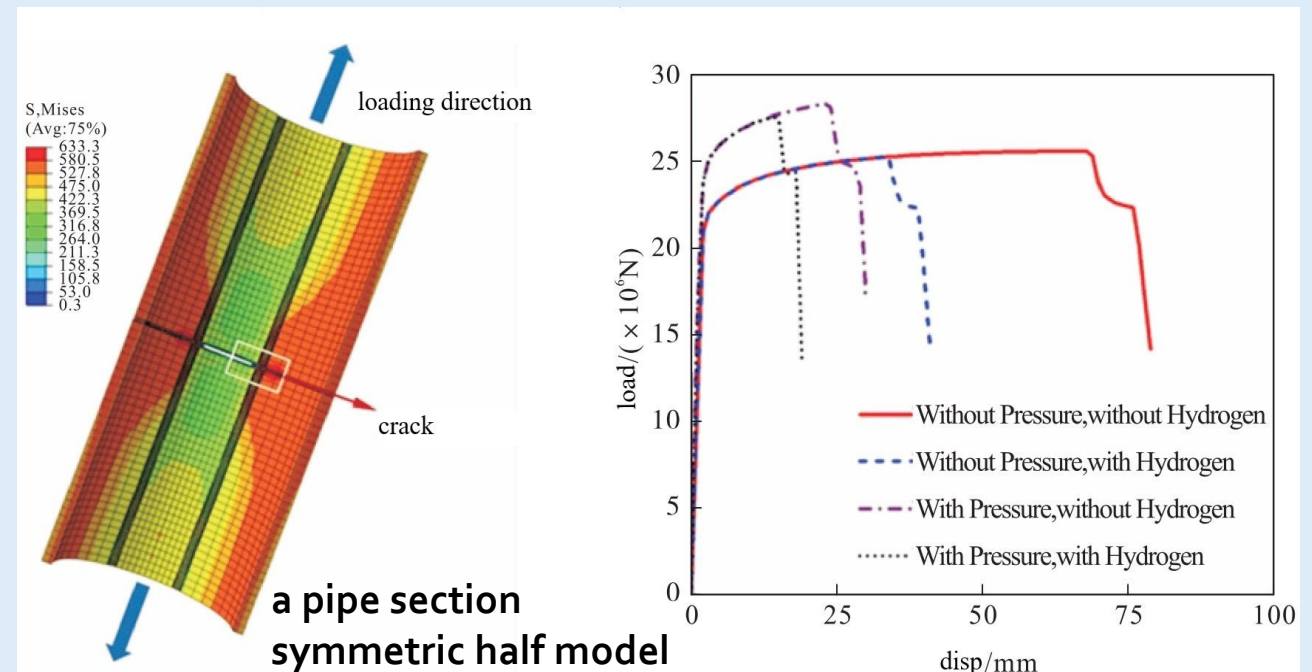
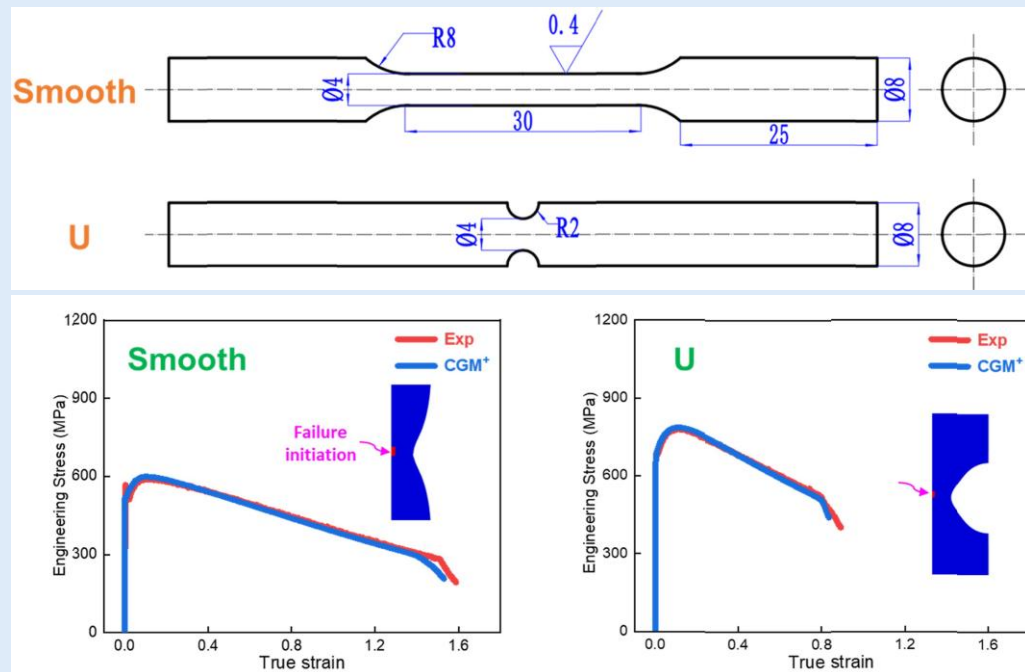


## Effect of gas pressure Pipeline steel X70



# A predictive model for hydrogen embrittlement

- Multiscale, and capable of modelling laboratory tests and full-scale pipelines.



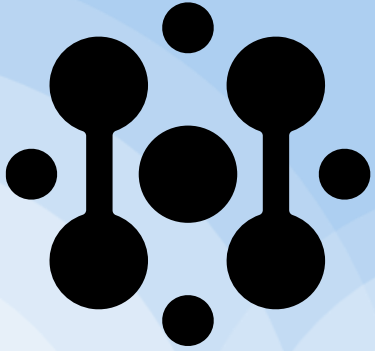
# Input to discussions on the roadmap

- To what extent do we require harmonized rules, standards and regulations for safety, including materials integrity specifically for the Nordics?
- Special conditions compared to central Europe?
  - Lower temperatures
  - Large portion of new pipelines vs repurposed natural gas pipelines.
- New standard for pipeline hydrogen transport: DNV-RP-F123 Hydrogen pipeline systems (March -26) covers sub zero temperatures.

# Input to discussions on the roadmap

- Are we in need of a common Nordic database for materials testing and modelling results?
  - The MatHias project has proposed a nomenclature for the data registration.
  - How do we make the database an available and a live tool for new H<sub>2</sub>-projects in the Nordics?

# Thank you!



**BUSINESS  
FINLAND**

 **Forskningsrådet**

 **Swedish  
Energy Agency**

 **Nordic Energy  
Research**

MatHias - The Nordic Hydrogen Valleys Conference, Trondheim, 28.04.2026

# Material and Structural Integrity Assessment for Safe Nordic Hydrogen Transportation Infrastructure

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Nordic Energy  
Research



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as Energy Hubs