

Expert Session 1 – Workshop1
Commercialisation Roadmap
Perspectives and Gaps for Hydrogen Storage

Gaps & Needs Coating L-H₂ Tank
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STORHY
FINAL EVENT

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➤ Material Investigation

- **Today:** maximum strain (start of cracking) of Cu-coating $\approx 0,9 \%$
- **Aim:** increase of maximum strain of coating $>2,0 \%$
- **Proposal:** investigation of different materials, e.g. Cu- and Al-alloys

➤ Verification Testing

- **Today:** first H₂ and He permeation tests on coated tank have been performed
→ Reduction of H₂ permeation rate at RT from $>5 \cdot 10^{-4} \text{ mbar} \cdot \text{l} \cdot \text{s}^{-1}$ (uncoated tank) to less than $3 \cdot 10^{-6} \text{ mbar} \cdot \text{l} \cdot \text{s}^{-1}$ (coated tank, detection limit of measuring device)
- **Aim:** investigation of long-term behaviour
- **Proposal:** permeation measurement and inspection of coating after intensive thermal and mechanical cycling

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➤ Process Optimization

- **Today:** single-unit, manual production, cost-intensive, time-consuming (3 days)
- **Aims:** decrease of costs and process time (1 hour), increase of repeatability, better thickness distribution of coating
- **Proposals:**
 - automated production in a custom-built galvanisation bath
 - parallelisation of production steps
 - investigation of parameters (current density, ion concentration, anode geometry) to reduce process time (feasible: 1 µm/min)
- **Alternative:**
 - usage of thin foil liners (e.g. 30 µm Al foil)
 - research on gas-tight joining techniques necessary (e.g. welding)