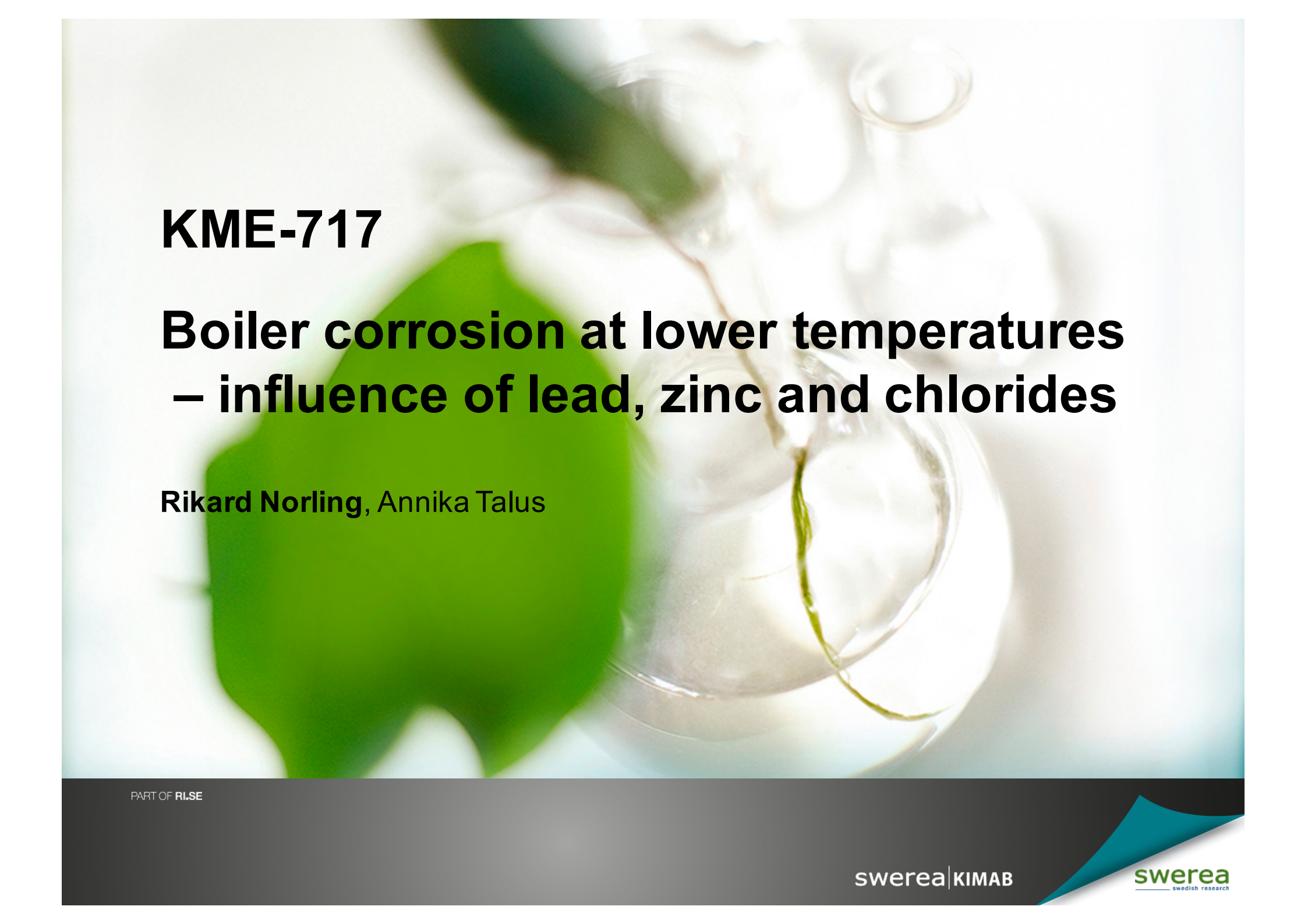


The background of the slide features a close-up, shallow depth-of-field photograph of laboratory glassware, including a round-bottom flask and a test tube, some containing liquids. A vibrant green leaf is positioned in the lower-left foreground, partially obscuring the glassware. The overall lighting is bright and soft, creating a clean, scientific aesthetic.

KME-717

Boiler corrosion at lower temperatures – influence of lead, zinc and chlorides

Rikard Norling, Annika Talus

KME-717

Boiler corrosion at lower temperatures – influence of lead, zinc and chlorides

Rikard Norling, Annika Talus



Annika Stålenheim
Pamela Henderson
Mattias Mattsson



Christoph Gruber



Eva-Katrin Lindman



Patrik Yrjas

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Project goals

- To find out if lead, zinc and their chlorides causes serious corrosion problems in the temperature range 150-420°C in boilers firing used wood,
 - and if the attack is worsened by the use of additive that reduce alkali chloride corrosion on superheaters at higher temperatures.
- Based on the knowledge acquired by full-scale probe testing and the results of modelling and laboratory testing solutions for minimizing potential problems will be suggested.
- To investigate and describe the ongoing corrosion processes and make an attempt to explain the mechanisms behind them to some extent.

Jordbro P7

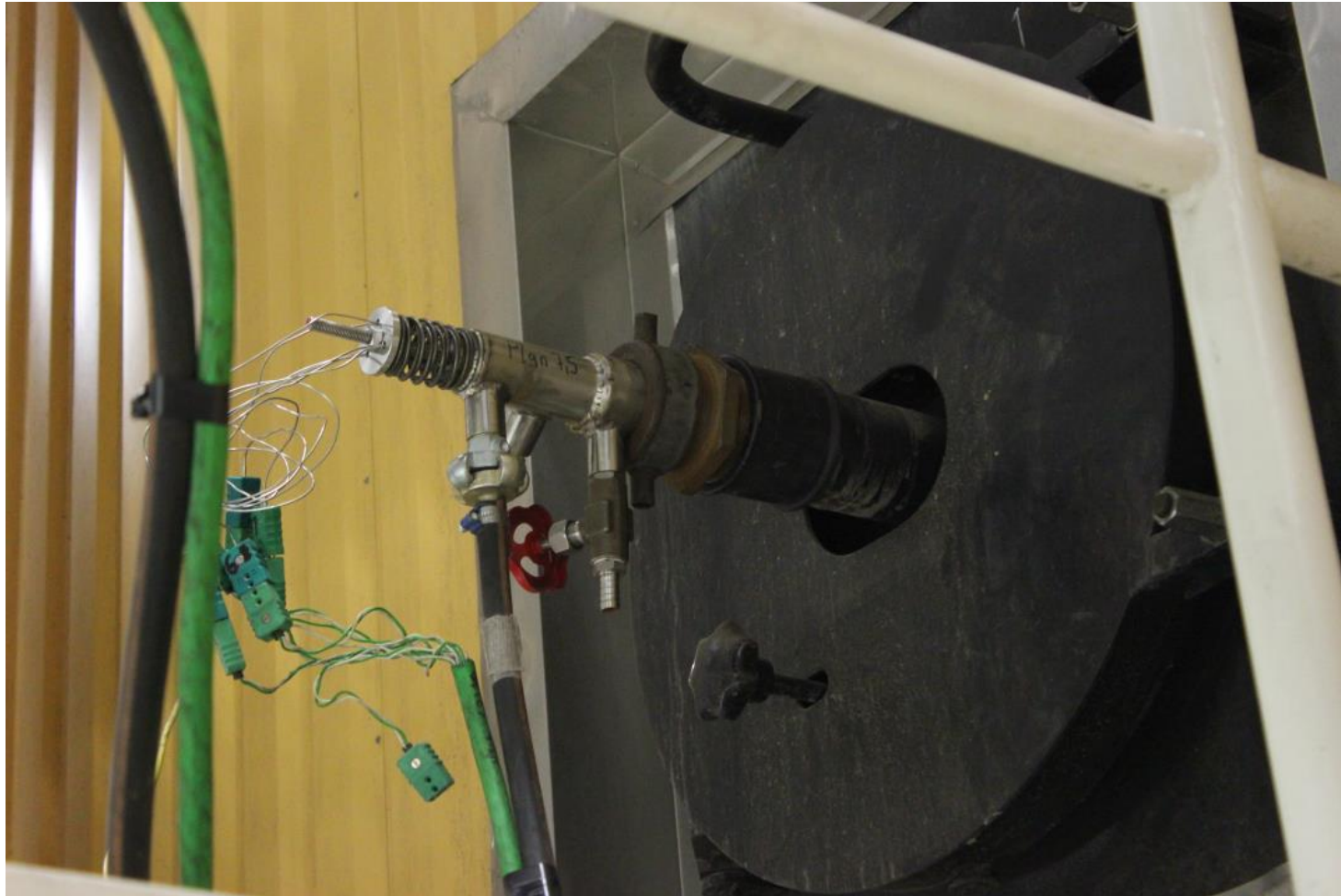
- BFB boiler
- Commissioned 2010
- 63 MW_{th}, 20 MW_{el}
- Steam data: 80 bar, 470°C
- Fuel 100% recycled (waste) wood
- ChlorOut (system with ammonium sulphate additive)



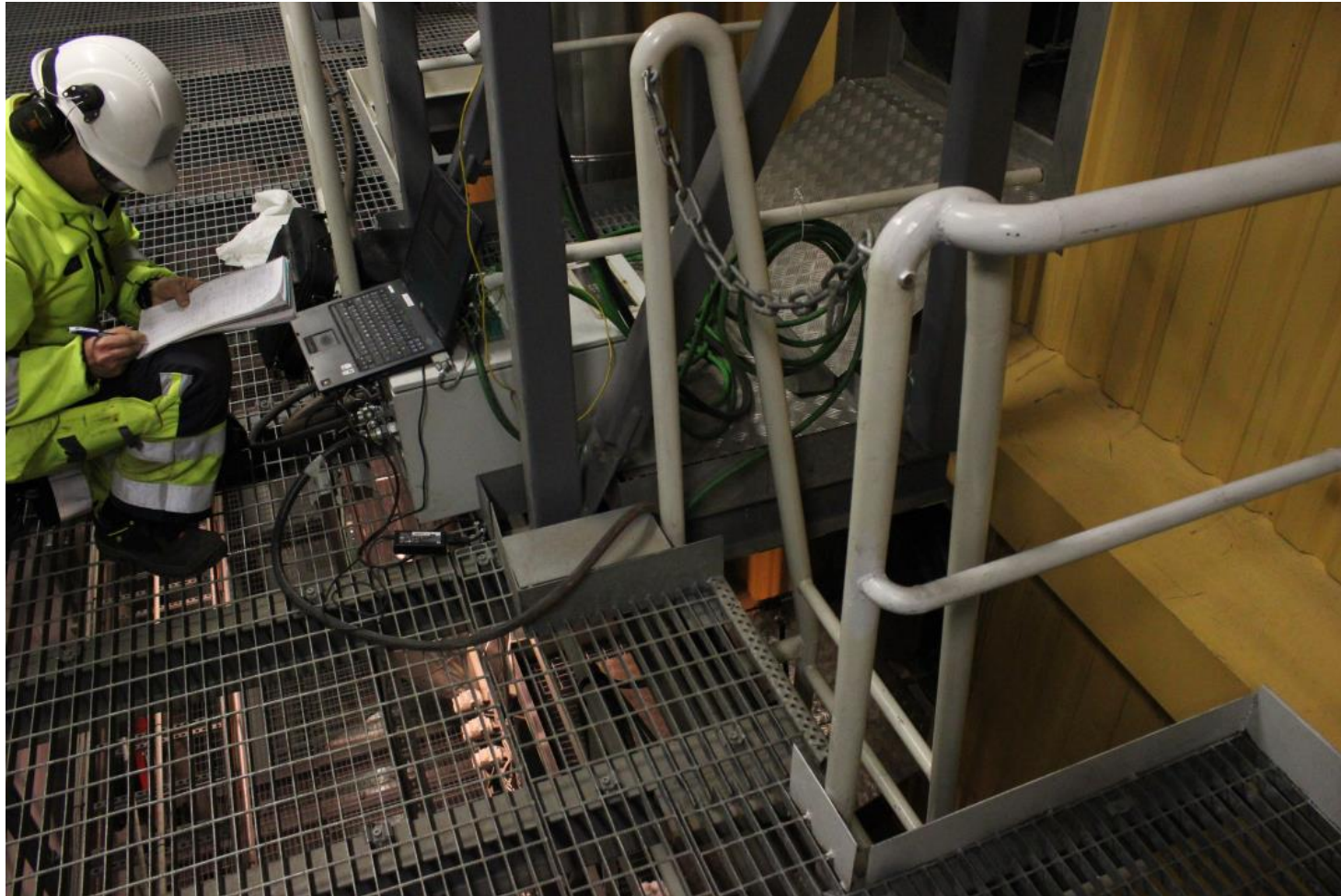
Performed short term field tests



Performed short term field tests



Performed short term field tests



Performed short term field tests



Performed short term field tests



Performed short term field tests



Probes after exposure



Leeward side

Reference
250-450 °C

Windward side



ChlorOut
250-450 °C

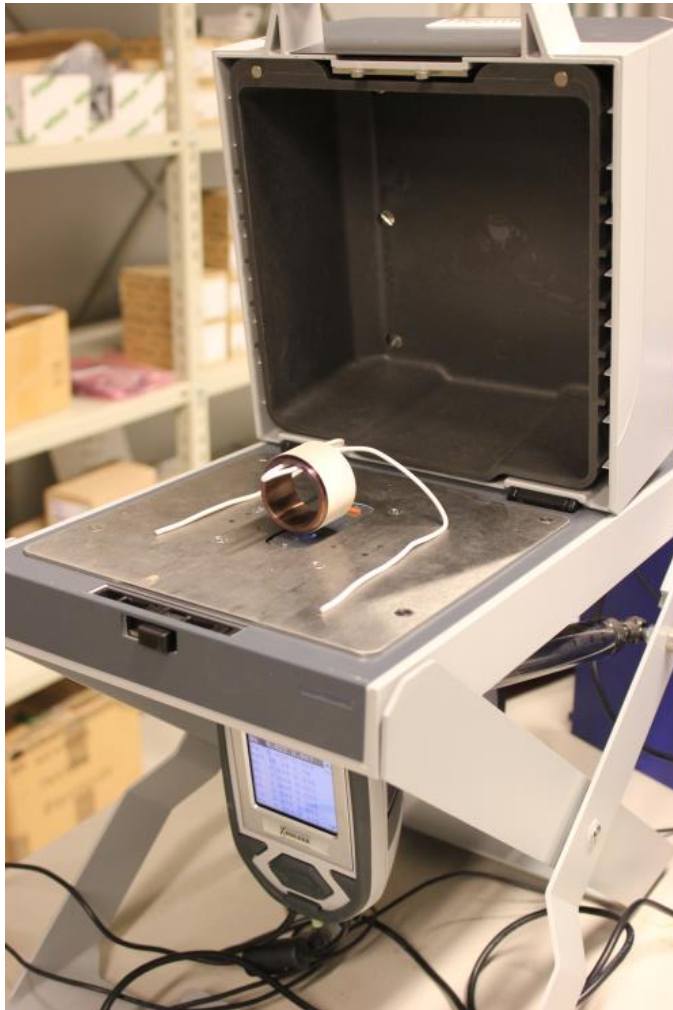
Performed short term field tests



Performed short term field tests

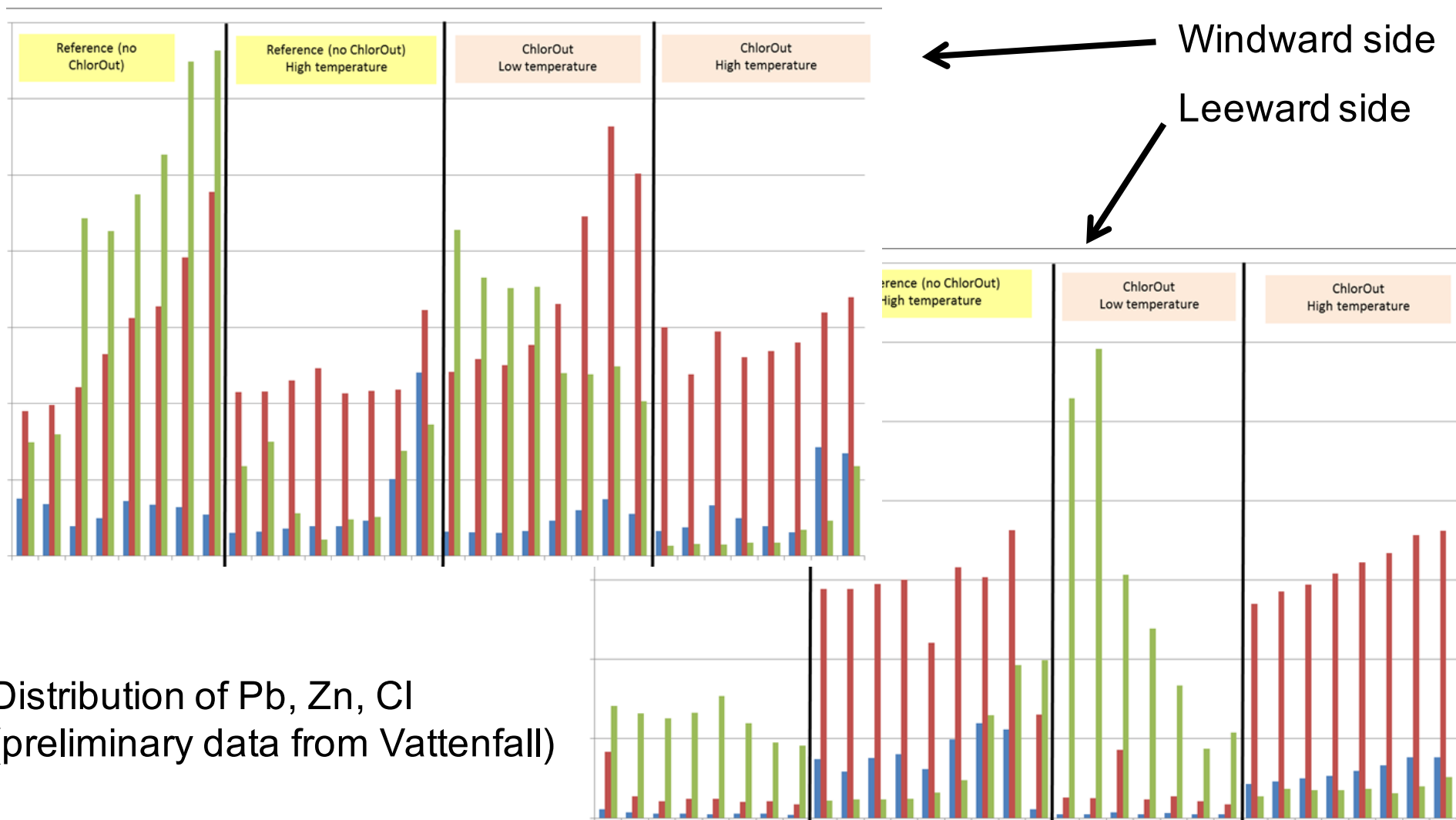


Performed short term field tests



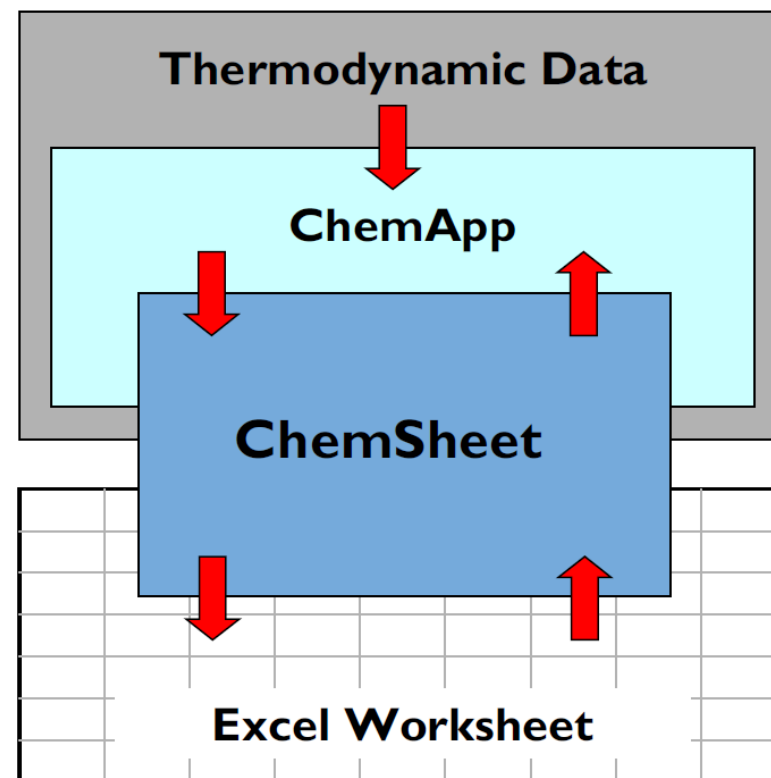
X-ray Fluorescence (XRF) analysis

XRF analysis of probe samples

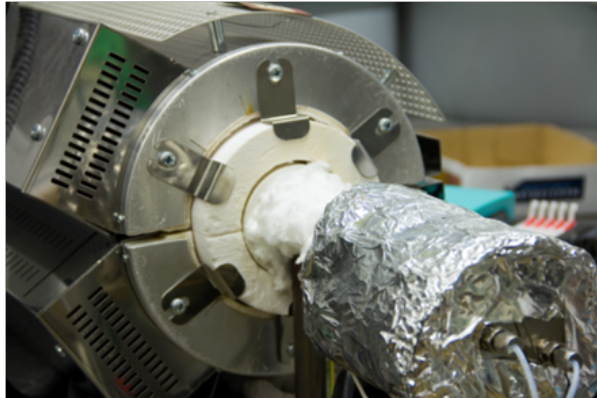
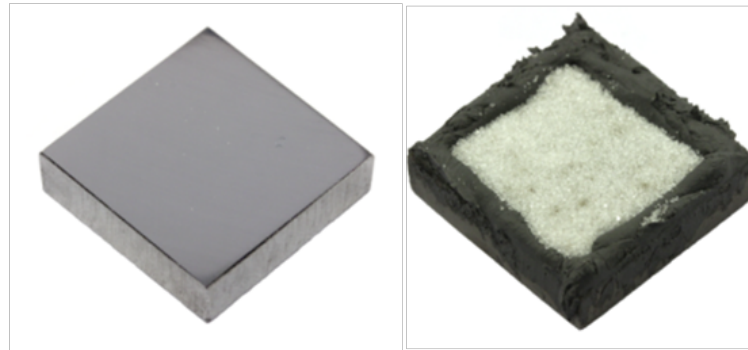


Chemsheet calculations by Andritz

- **Chemsheet** works as an add-in program of general thermodynamics in **Excel**.
- The thermochemical programming library **ChemApp** is used in combination with its application-specific thermochemical data
- ChemSheet is straightforward and requires no programming skills other than normal Excel use
- To the user, the process model can be just one Excel-file
- Andritz has a tailor-made database from Åbo University (“Andritz Melt”)

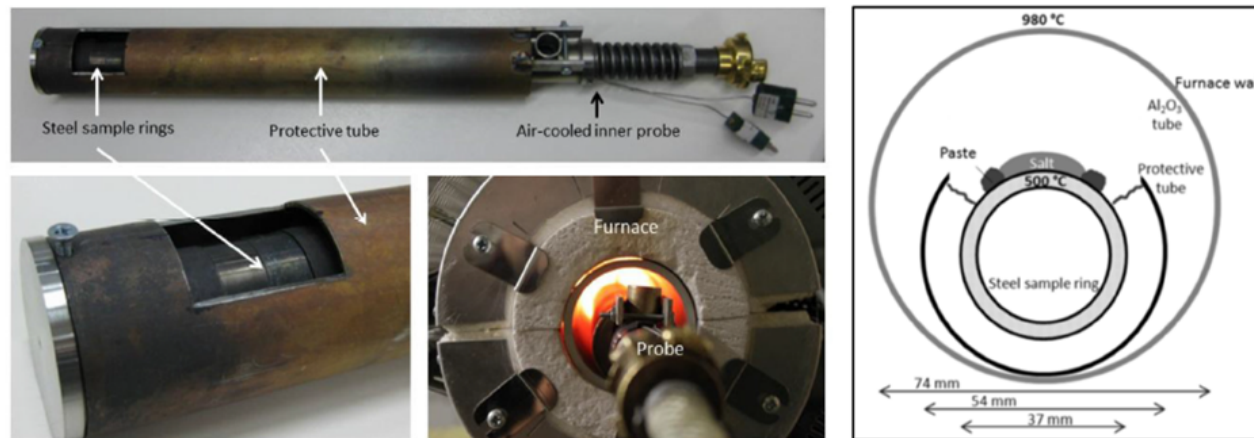


Isothermal corrosion tests at ÅA



Testing of temperature gradient effect on salt and corrosion at ÅA

- Steep temperature gradient over superheater and deposit (surface => gas)
- Laboratory simulations



Concluding remarks

- Long term field tests will be made
- Results of the field tests will be correlated to simulation and laboratory test results
- Finally solutions for minimizing potential problems will be suggested



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