

Wir schaffen Wissen – heute für morgen

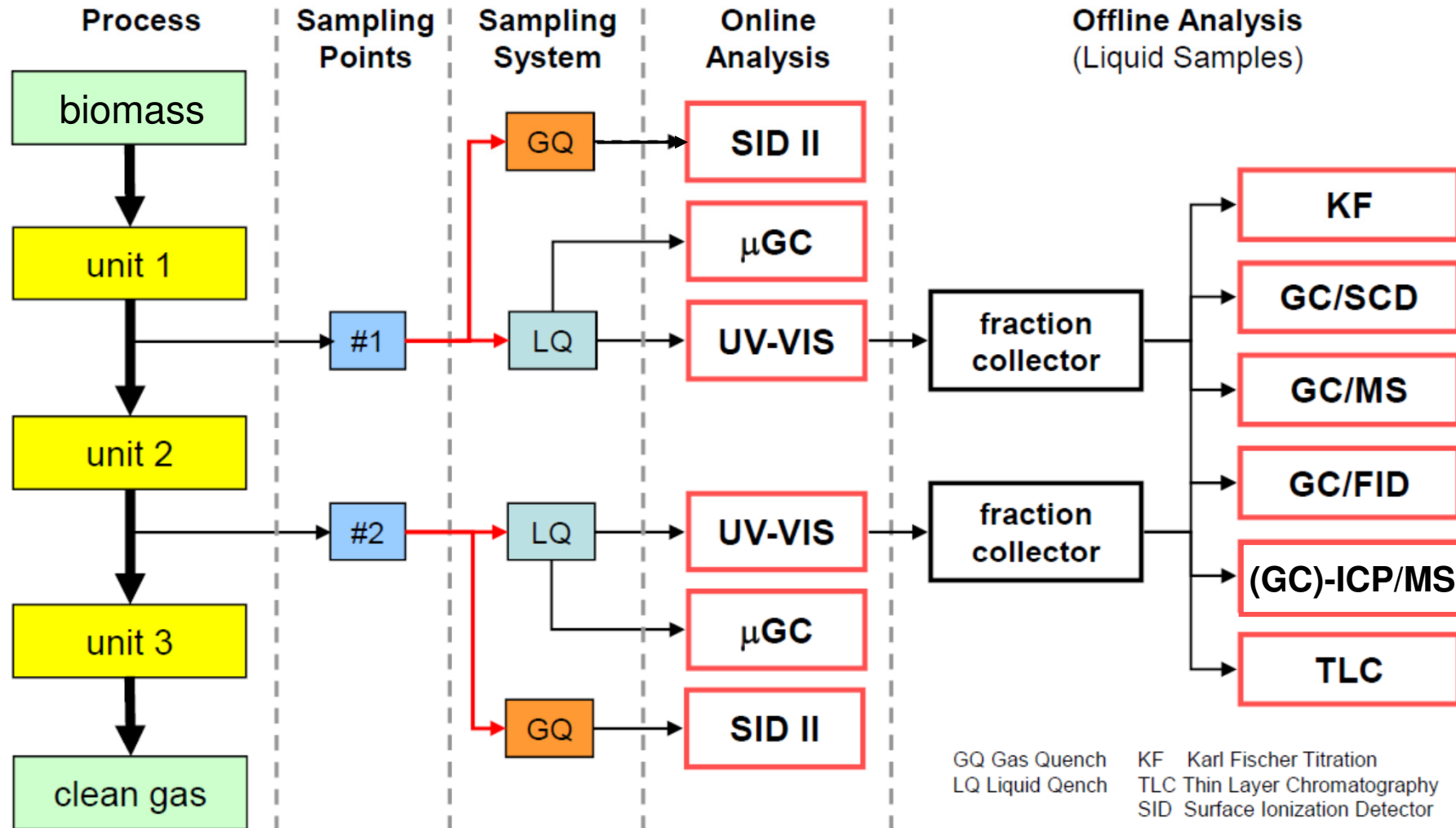
Paul Scherrer Institut

M. Wellinger, A. Schuler, J. Schneebeli, Chr. Ludwig, S. Biollaz

PSI toolbox regarding trace elements: Alkali, Cl, metals

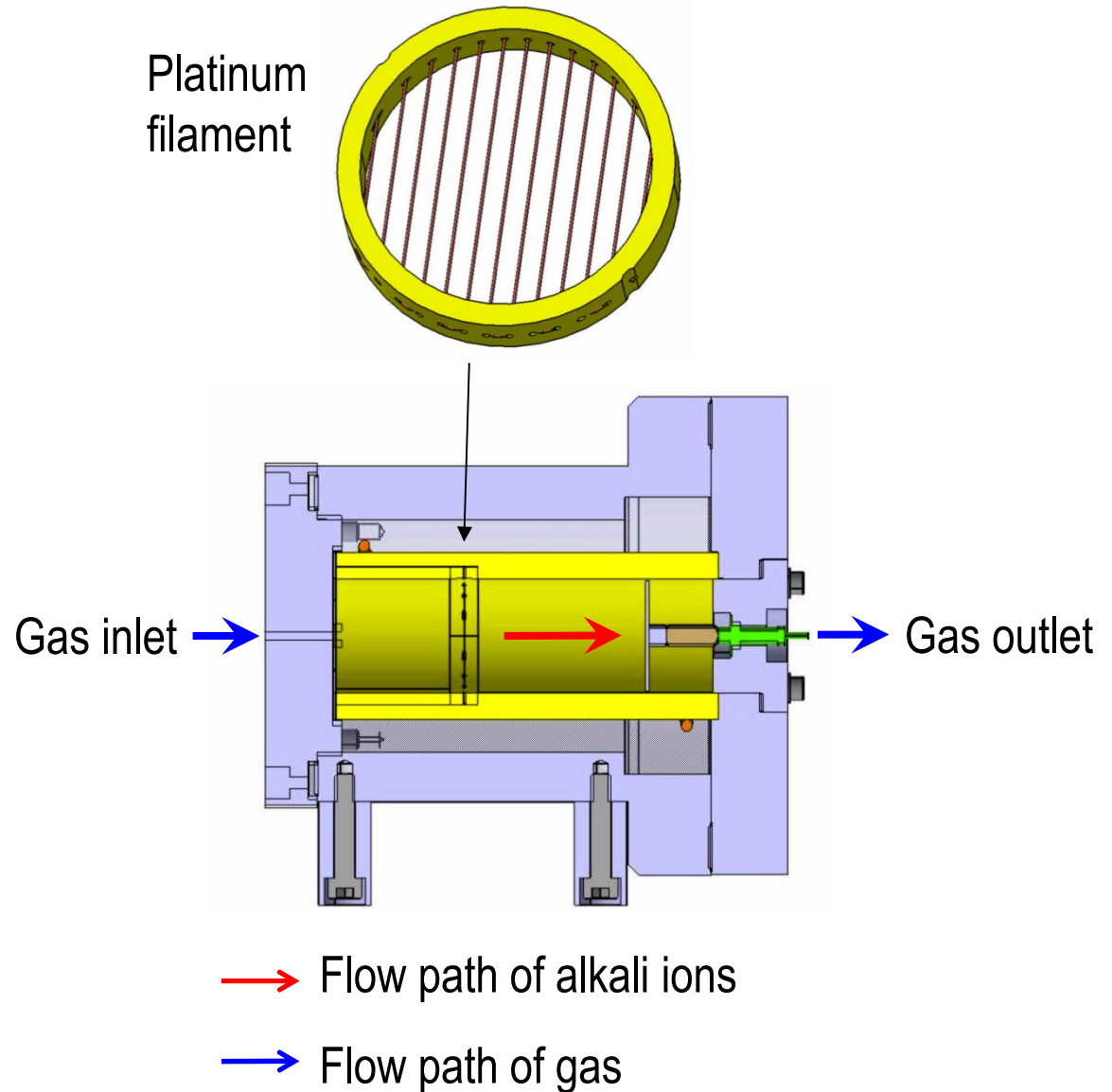
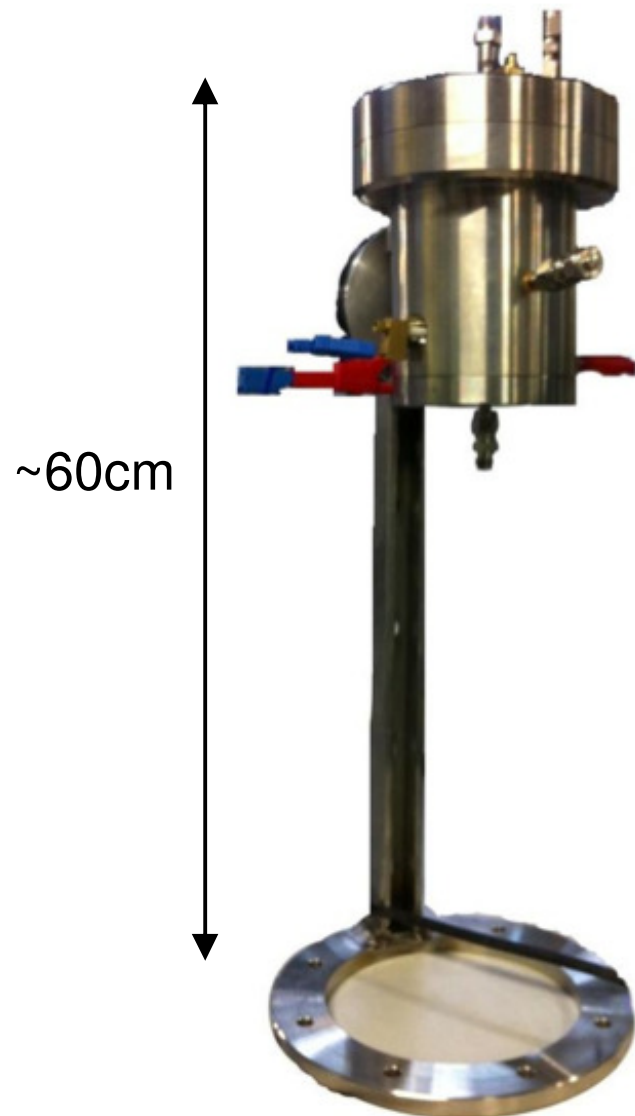
- PSI diagnostic toolbox
- SID for alkali measurement
- GC-ICP/MS
- Summary

PSI diagnostic toolbox

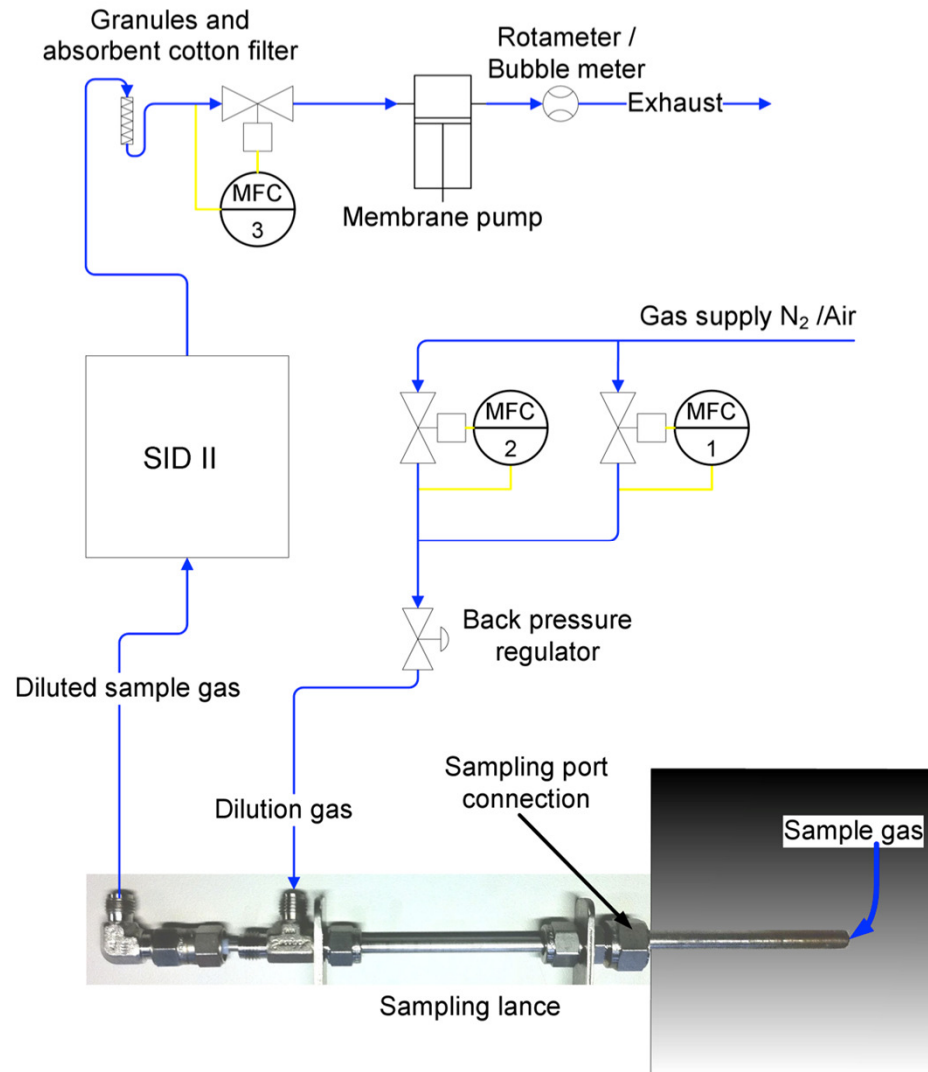


SID for alkali measurement

SID: Surface ionisation detector

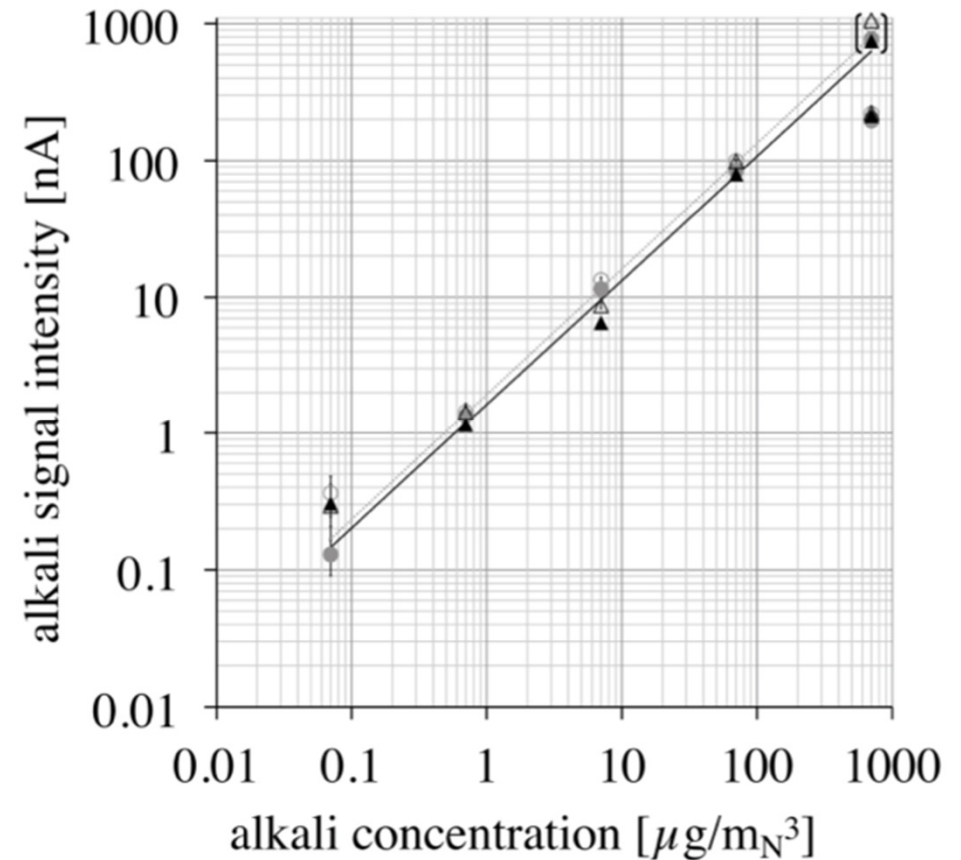


Gas Quench System



Calibration

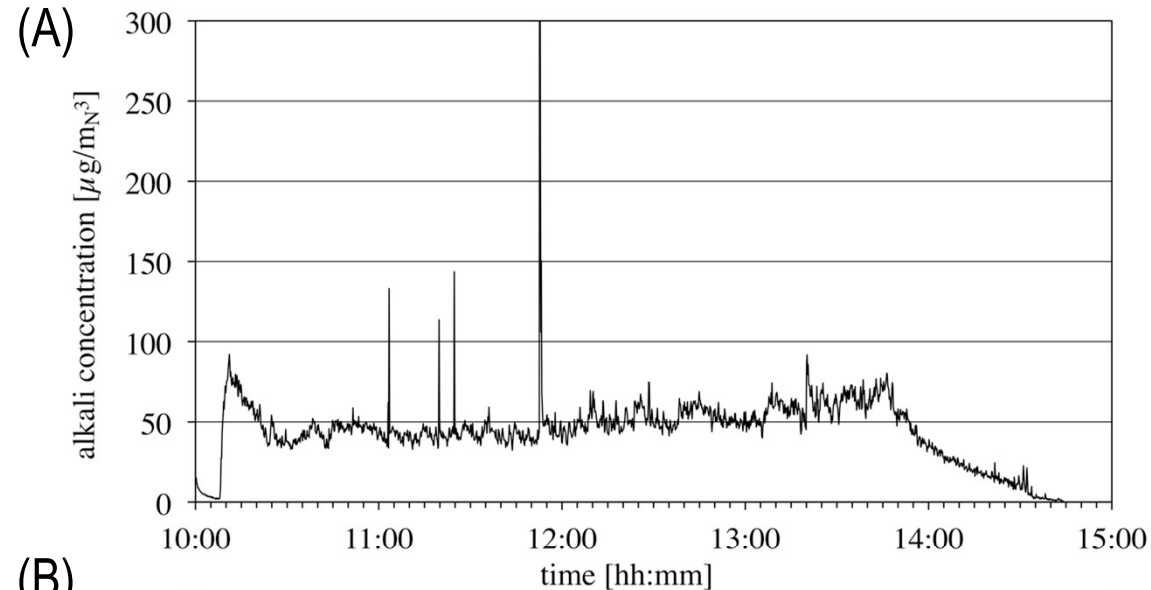
Calibration curves conducted by dispersing aqueous solutions with an ultrasonic nebulizer



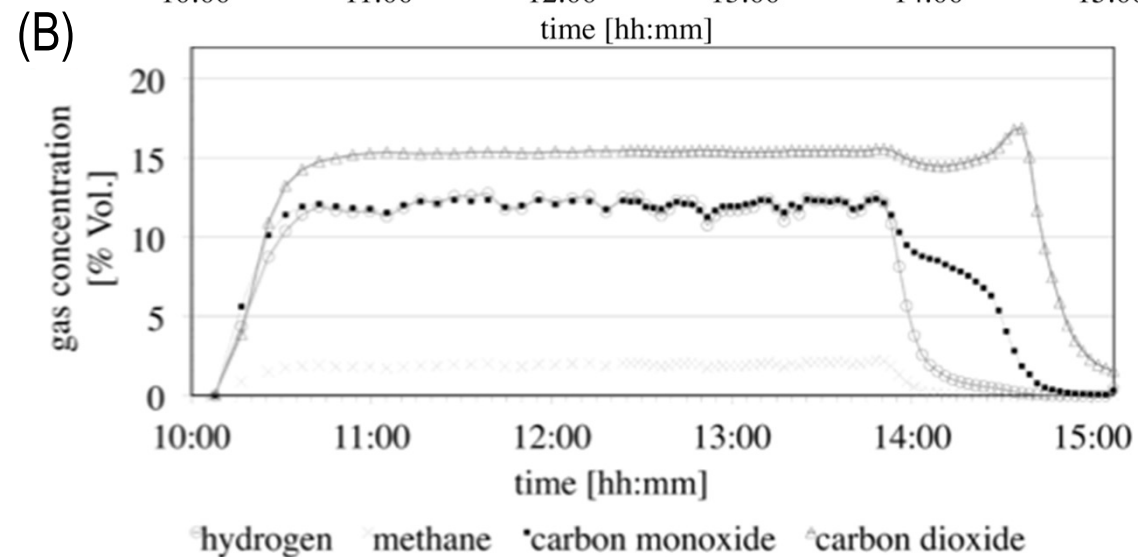
Δ Sodium in air, \blacktriangle sodium in nitrogen,
 \bullet Potassium in nitrogen \circ Potassium in air,

Measurements at a bubbling fluidized bed (1 kg/h) using wood pellets as feedstock

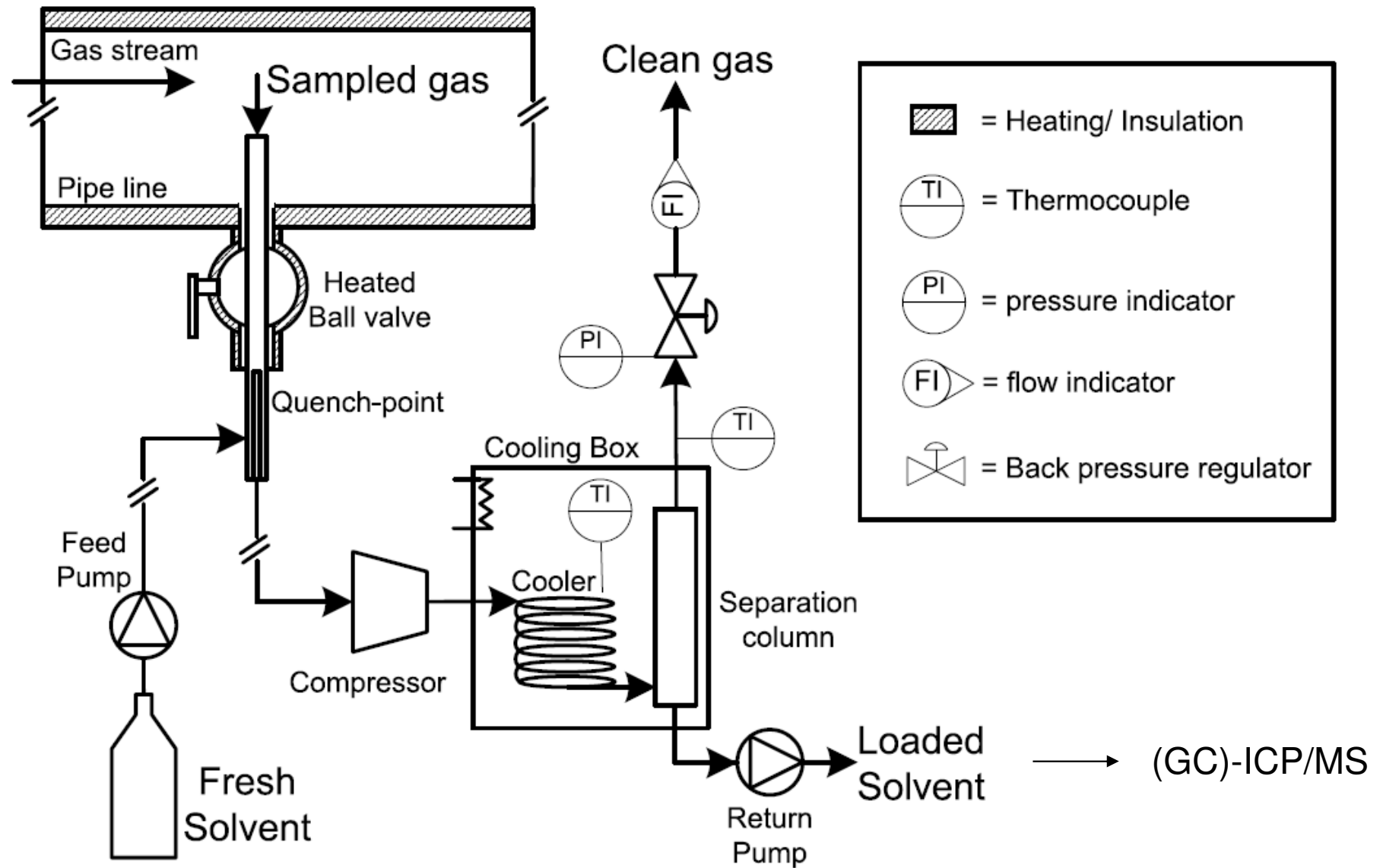
Signal from SID



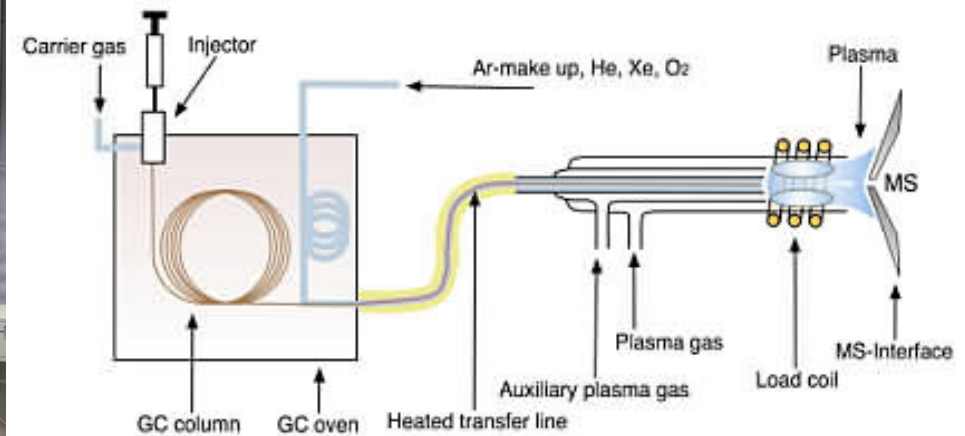
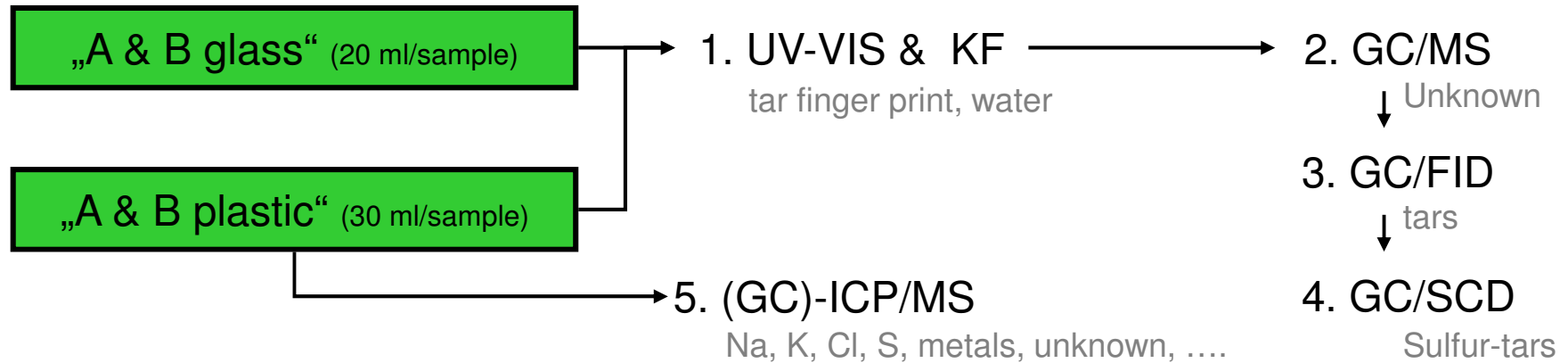
Gas analysis with μGC



GC-ICP/MS



Analysis of liquid samples



Summary

- Measuring trace elements like alkali, Cl or metals needs other analytical instruments, that those commonly known today
- Sampling and Quantification of these trace elements is to some extent similar or follows the sample principals as for tar measurement
- A lot of work is ahead of us, getting these trace elements properly quantified
- Maybe the development of the “sulfur protocol” is a good starting basis for the development of protocols for the other trace elements.