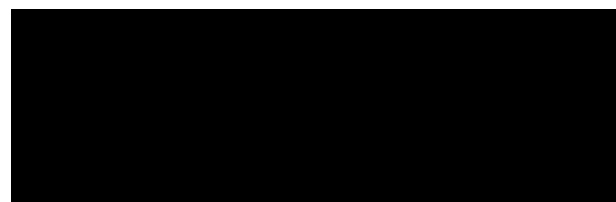
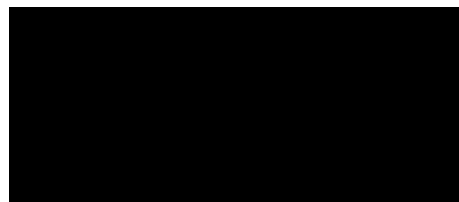


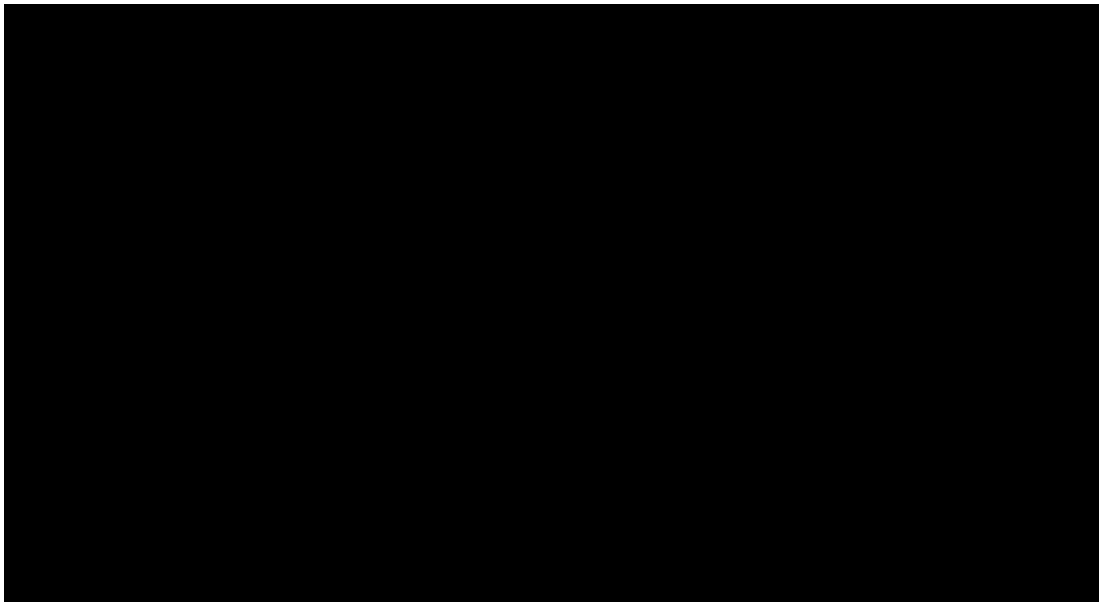
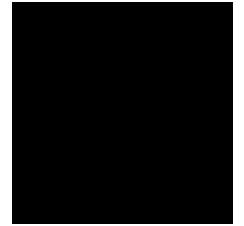
Adsorption of ammonia on metal and polymer surfaces

Olavi Vaittinen

University of Helsinki



CRDS setup characteristics



Tuning range: 1520 - 1575 nm
(6350 - 6575 cm^{-1})

Sensitivity: $7 \times 10^{-11} \text{ cm}^{-1}$

Acquisition time: $\leq 0.5 \text{ s}$ - 3 min

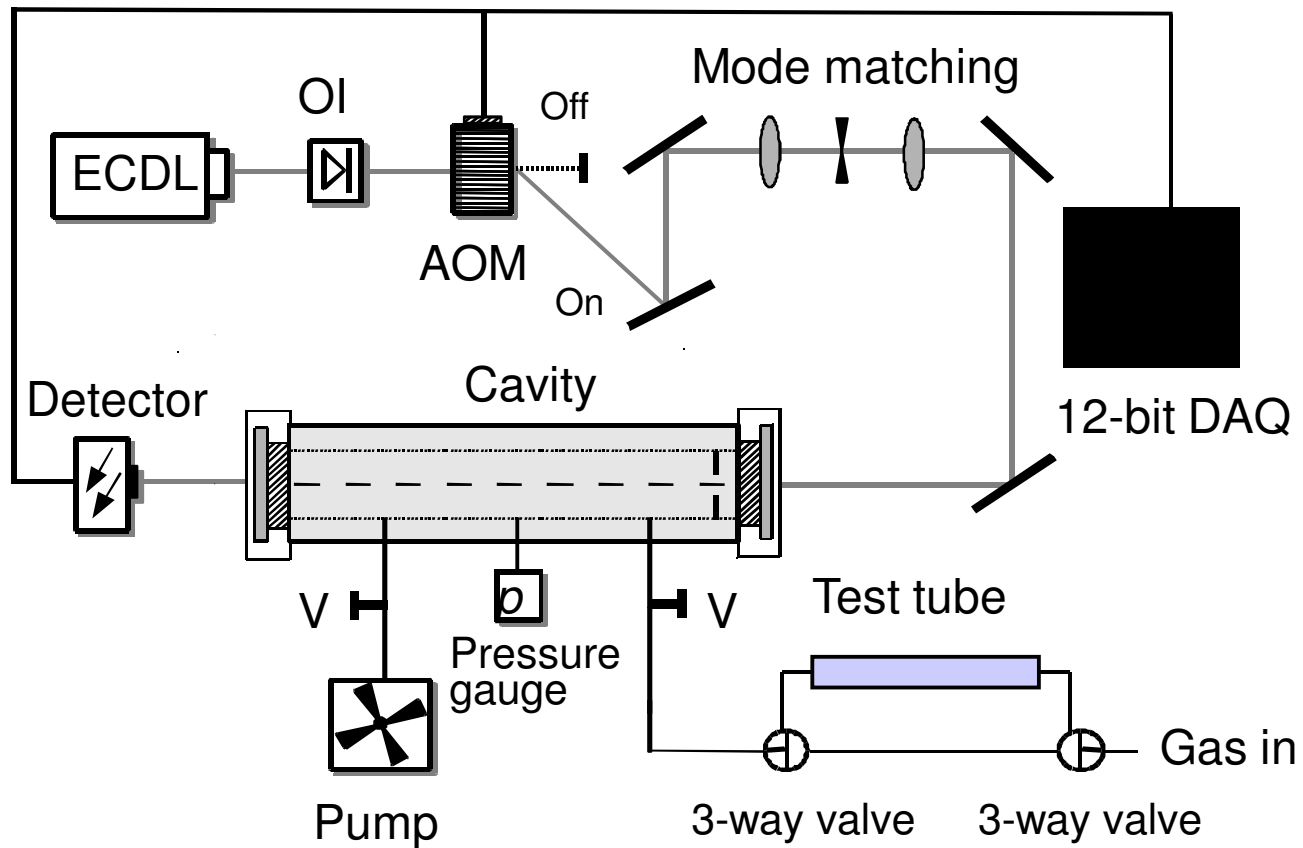
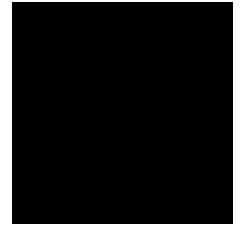
Detected at ppt level:

NH_3 (500 ppt), C_2H_2 (100), HCN
(200)

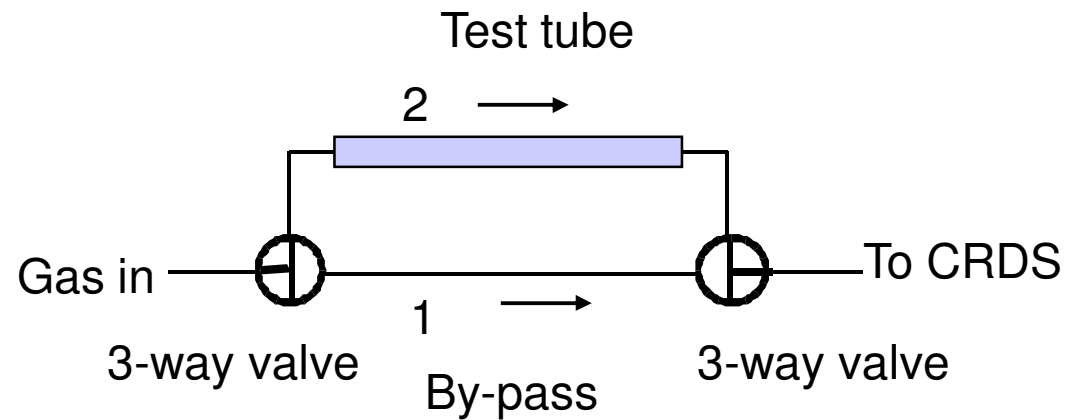
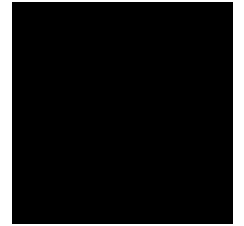
Other detectable species:

CH_4 , N_2O , H_2S , CO , CO_2 , H_2O

Experimental setup



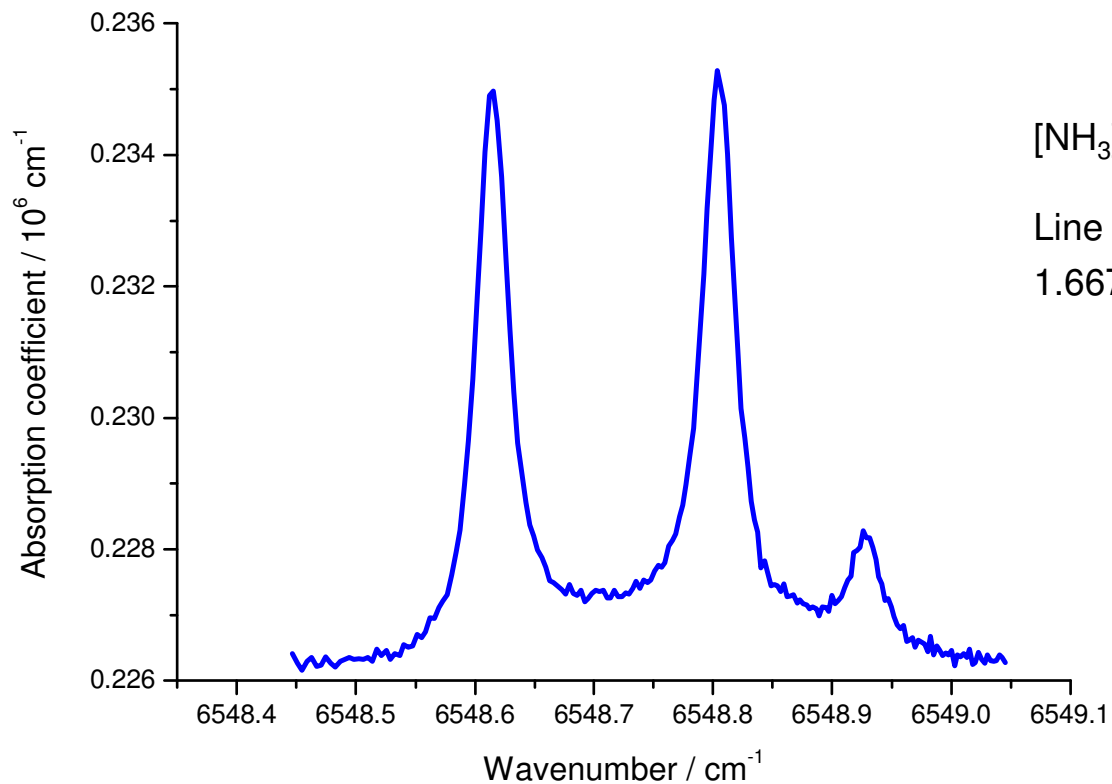
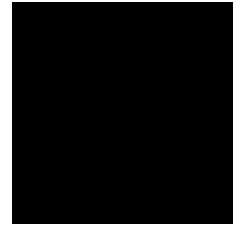
Test tube setup



Variables:

- Tube coating (metal, coating, polymer)
- Ammonia concentration
- Flow rate
- Temperature
- Water contents

Ammonia absorption spectrum

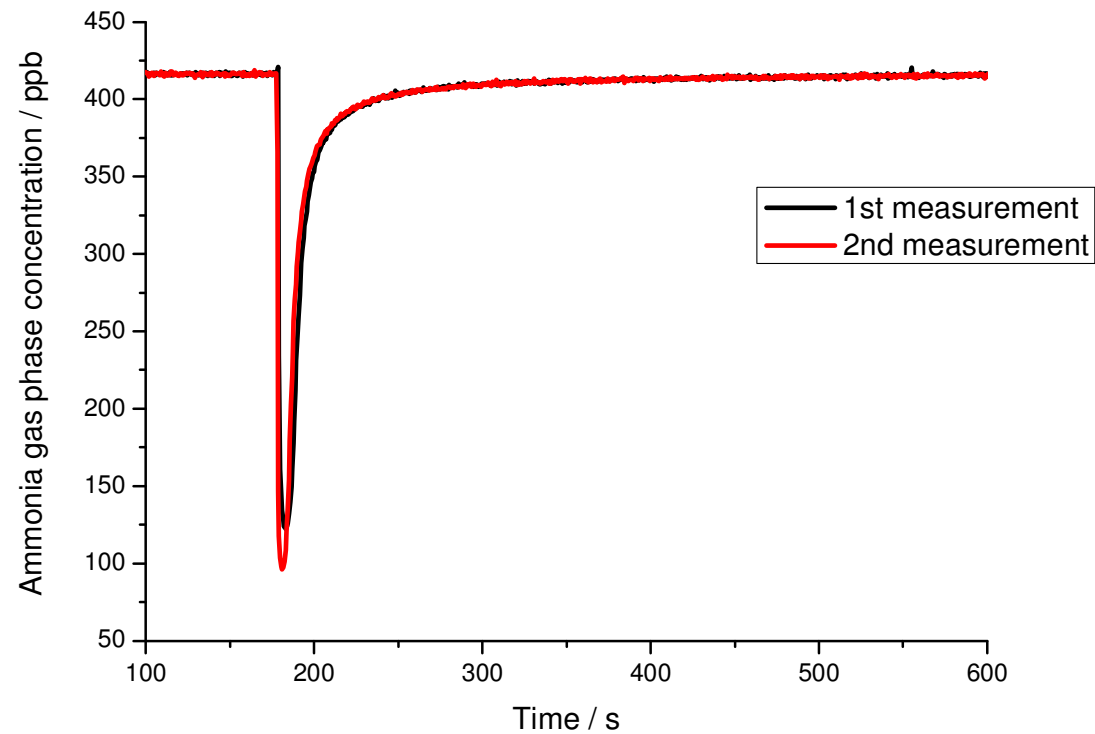
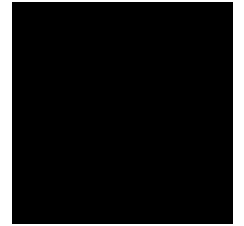


[NH₃] = 91 ppbv

Line strength (6548.79 cm⁻¹, 296 K)=
1.667 × 10⁻²¹ cm × molecule



Reproducibility

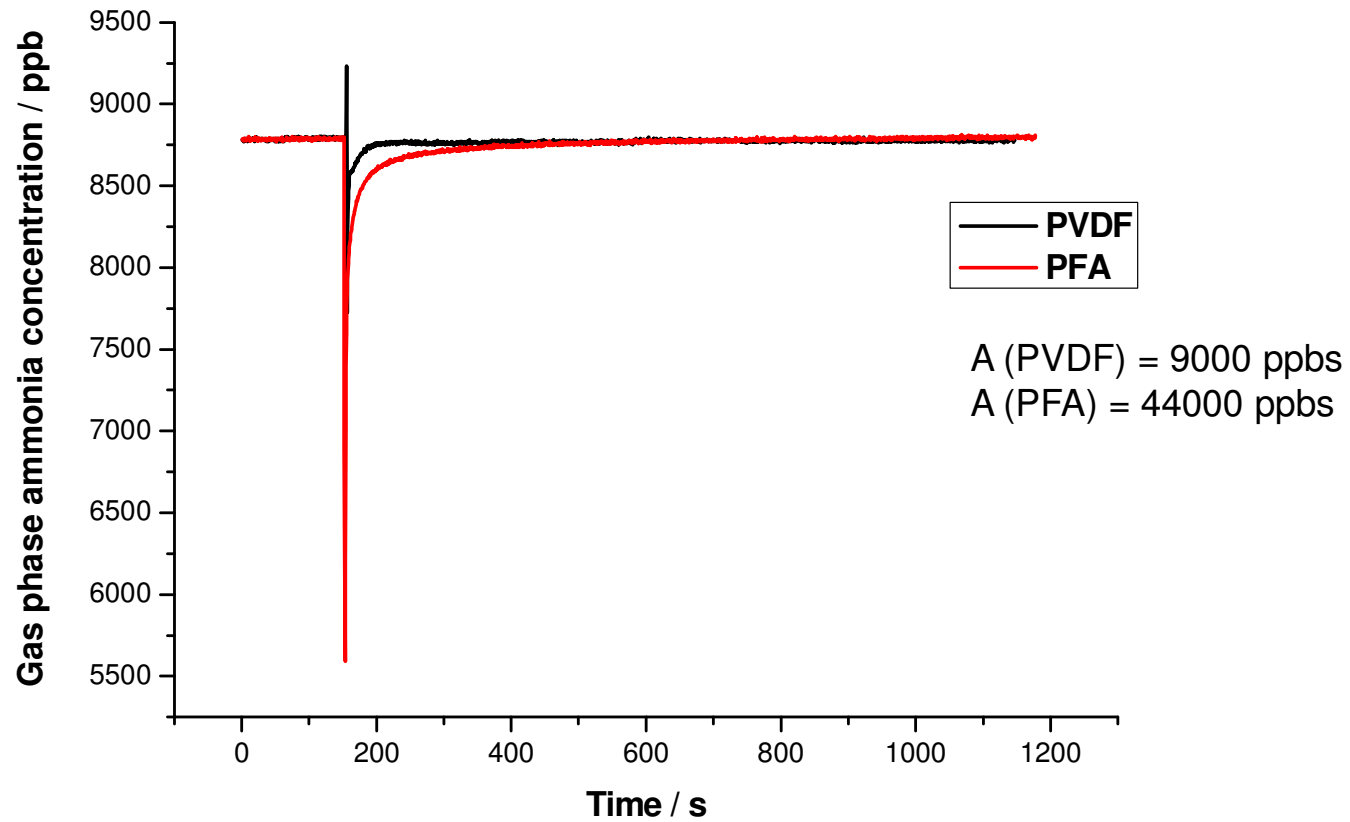
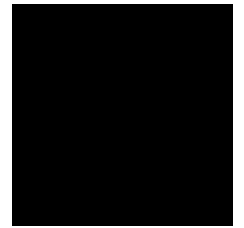


Electro-polished
SS316L, 420 ppb

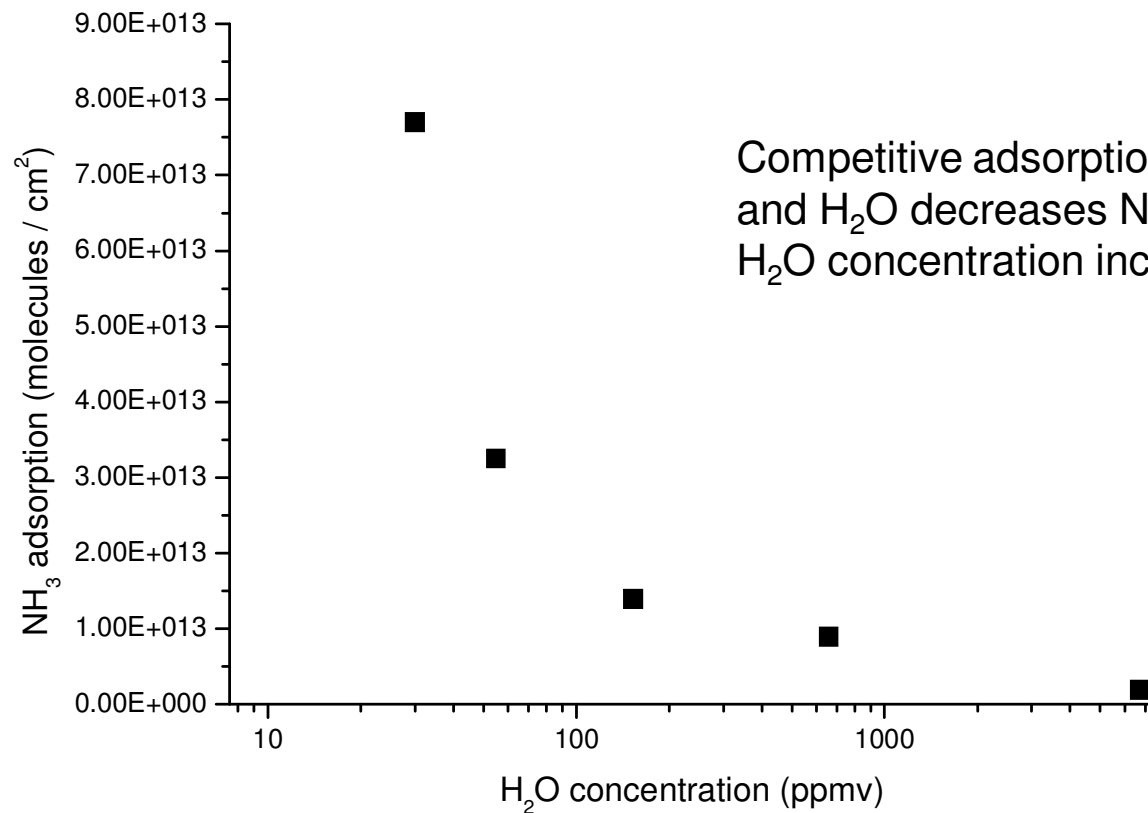
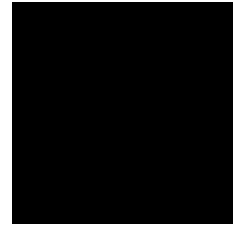
A (1st) = 6720 ppbs

A (2nd) = 6460 ppbs

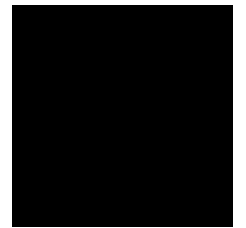
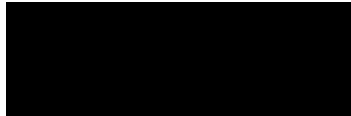
PFA vs PVDF



Effect of water



Acknowledgements



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