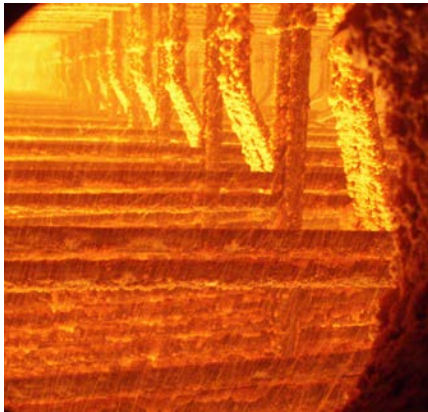


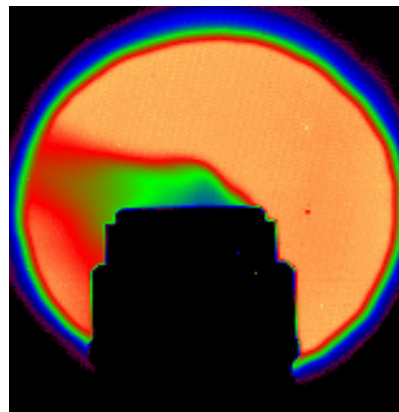
Absorption by gases

Gas cell measurements

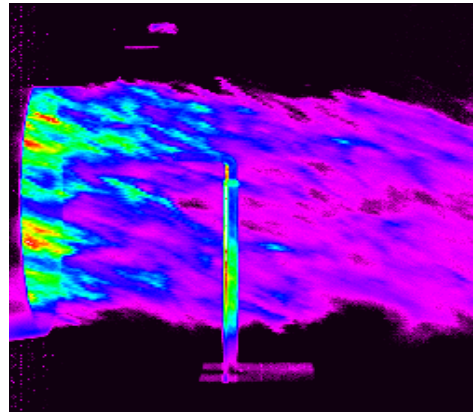
Sønnik Clausen
sqcl@kt.dtu.dk



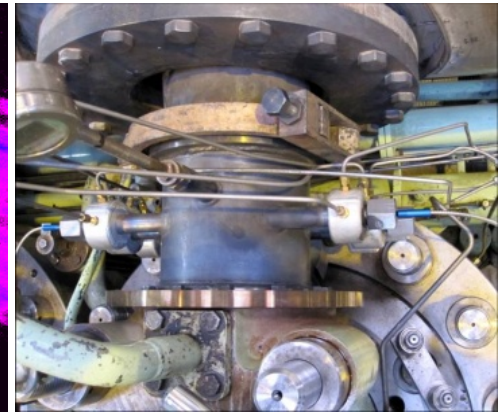
Boiler



Leak valve bottle



Exhaust air craft engine

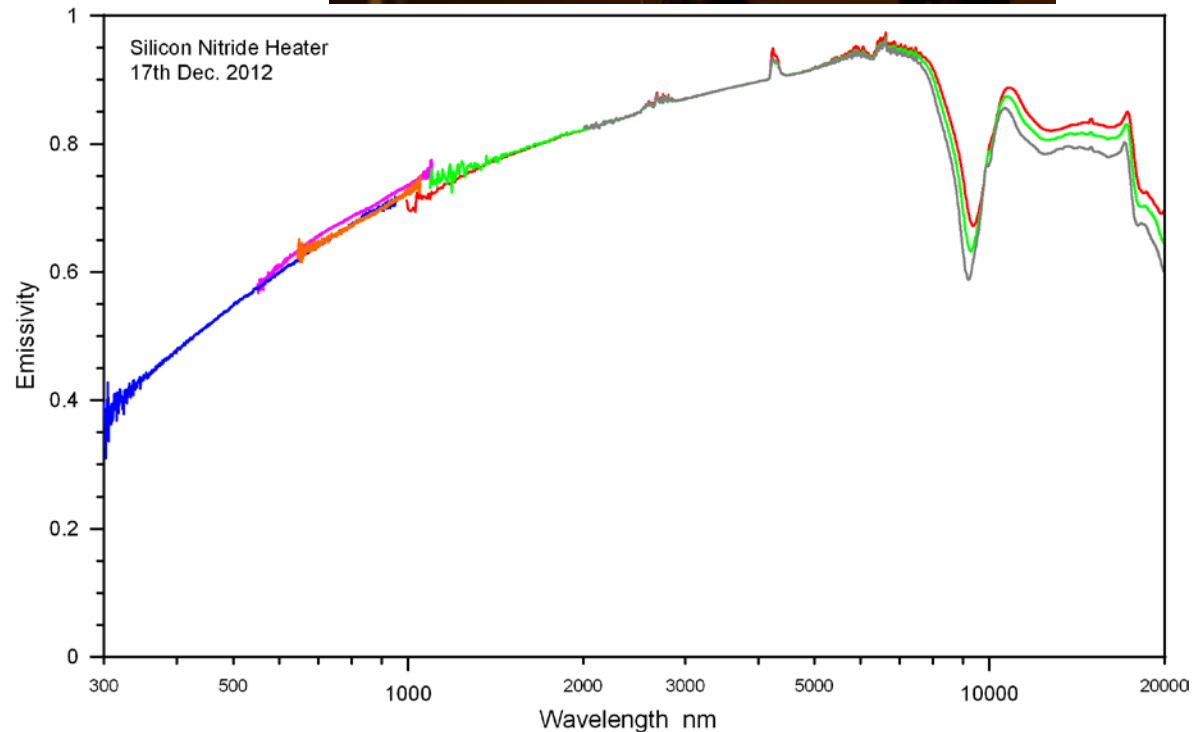
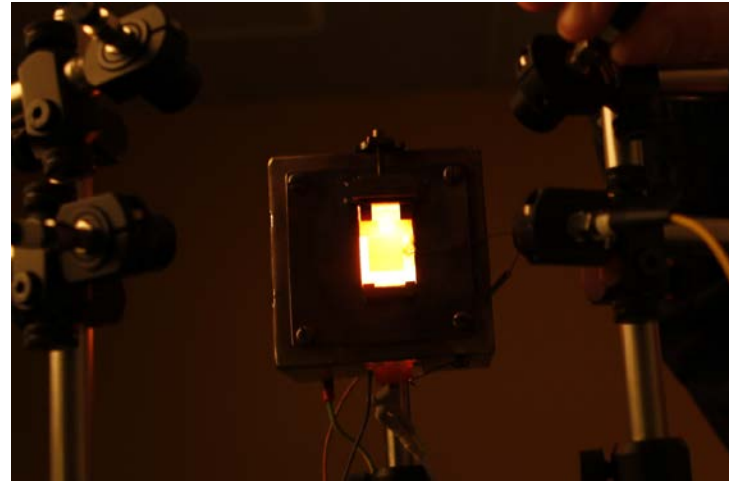


Measurement engine

RADIATION SURFACE

Blackbody
IR camera
Spectrometer
Accessories...

- Calibration
- Measurements
- Emissivity
- Reflection
- Absorption



RADIATION GAS

Welcome clausen!
My account
Log Out

Spectral Calc.com

High-resolution spectral modeling

GATS

Gas-Cell Simulator | Atmospheric Paths | My Spectra | Line List Browser | Blackbody Calculator | Atmosphere Browser | Solar Calc

Observer | **Gas Cells** | Source | Plot Options | My Settings | Batch Jobs

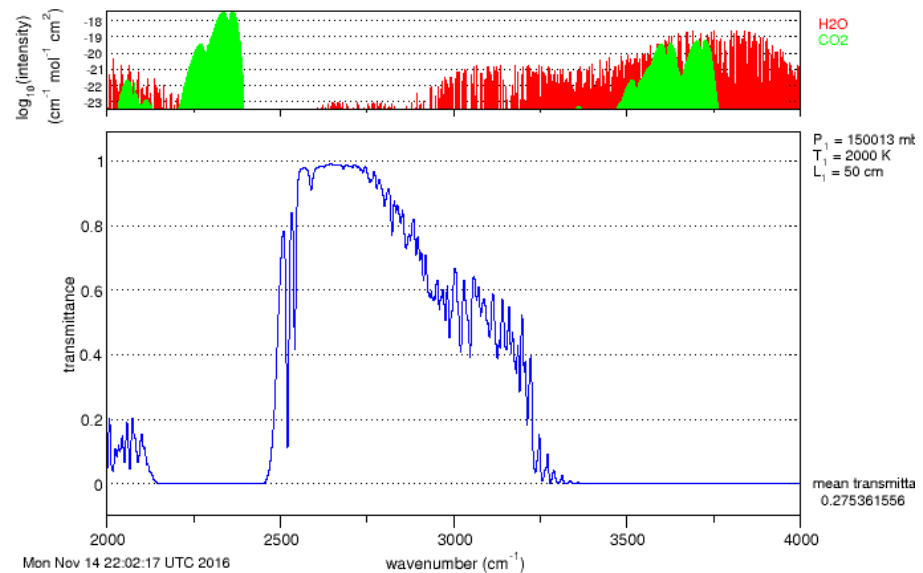
Gas Cell Description

No. of Gases: 2 | Line List: HITRAN2012 | No. of Cells: 1

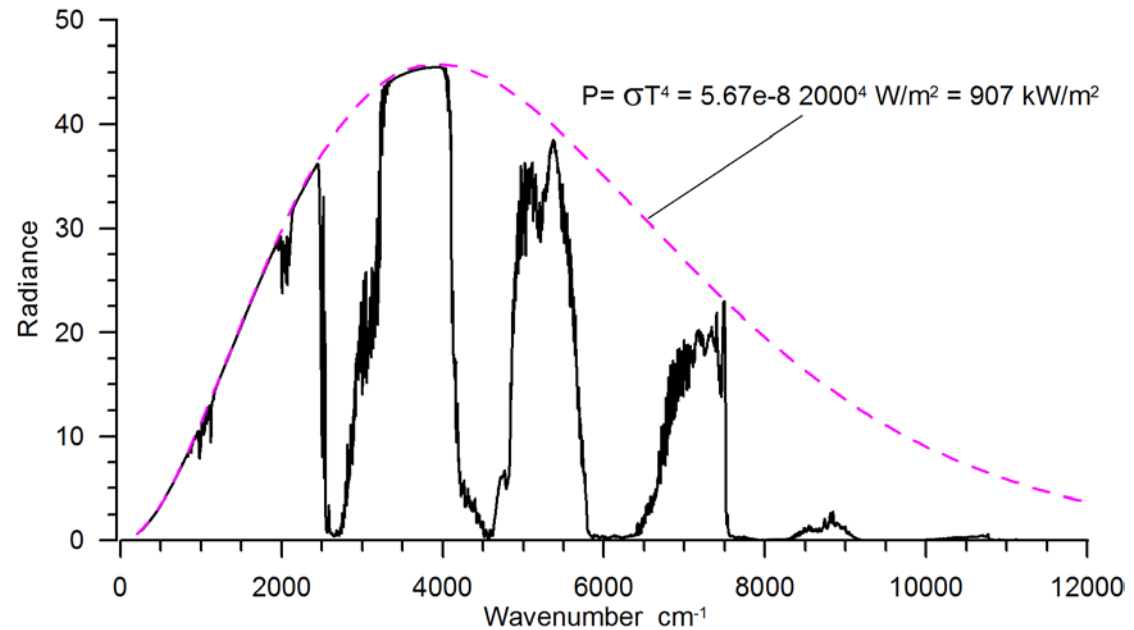
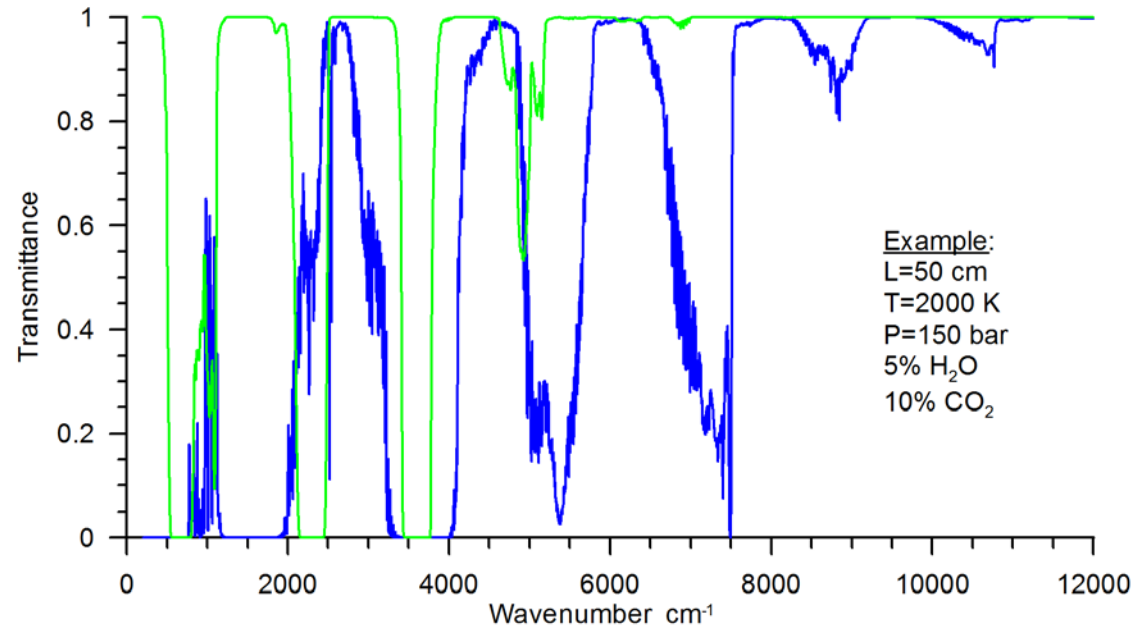
Length (cm): 50
Pressure (mbar): 150013.25
Temperature (K): 2000

Gas	Isotopologue	VMR
CO2	All	0.1
H2O	All	0.05

Calculate | Clear Plots | Reset All | Help



RADIATION GAS



High Temperature



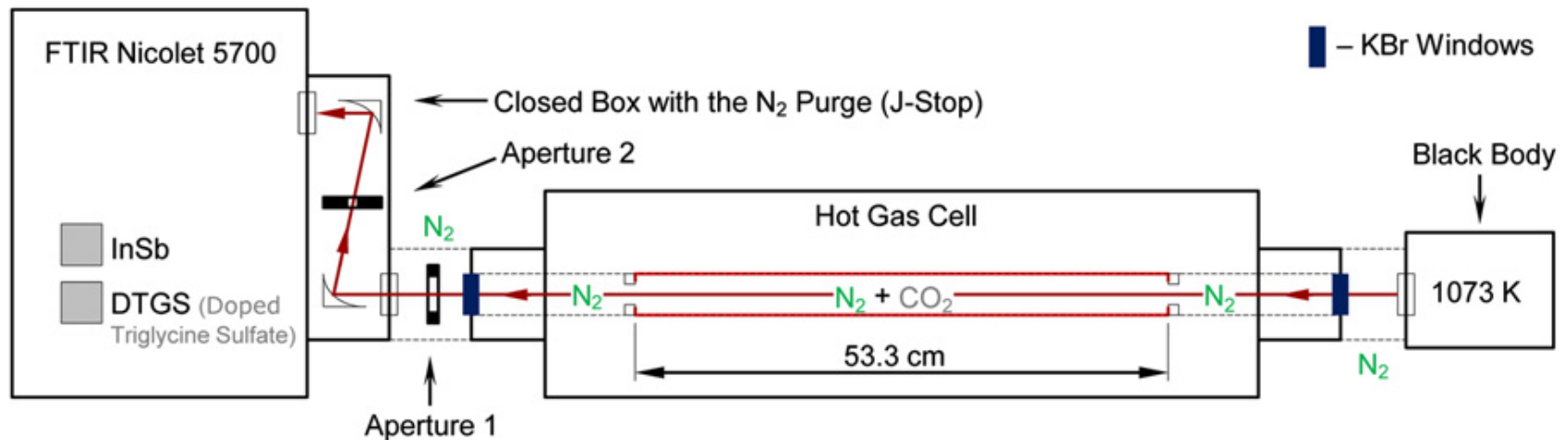
Contents lists available at SciVerse ScienceDirect

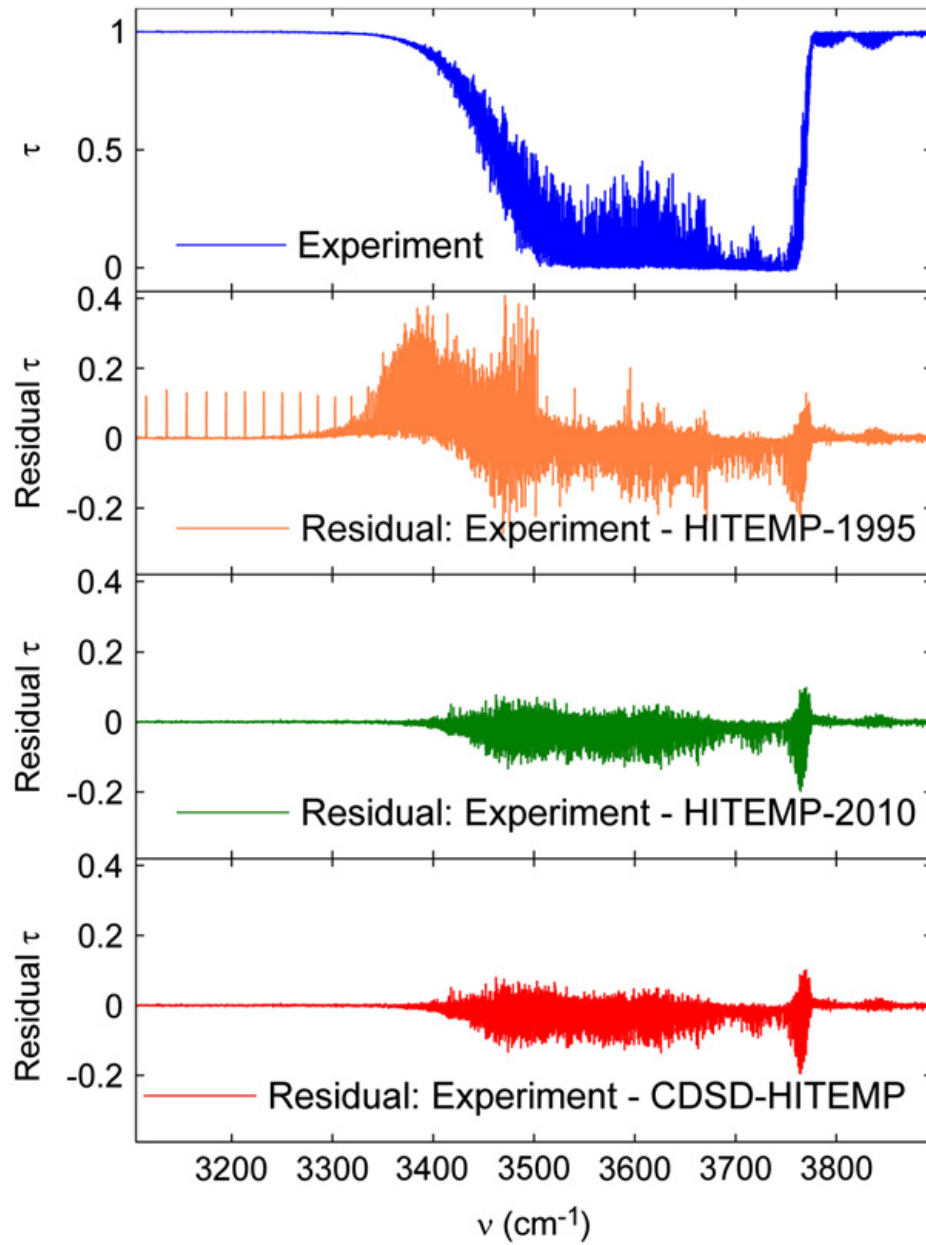
Journal of Quantitative Spectroscopy & Radiative Transfer

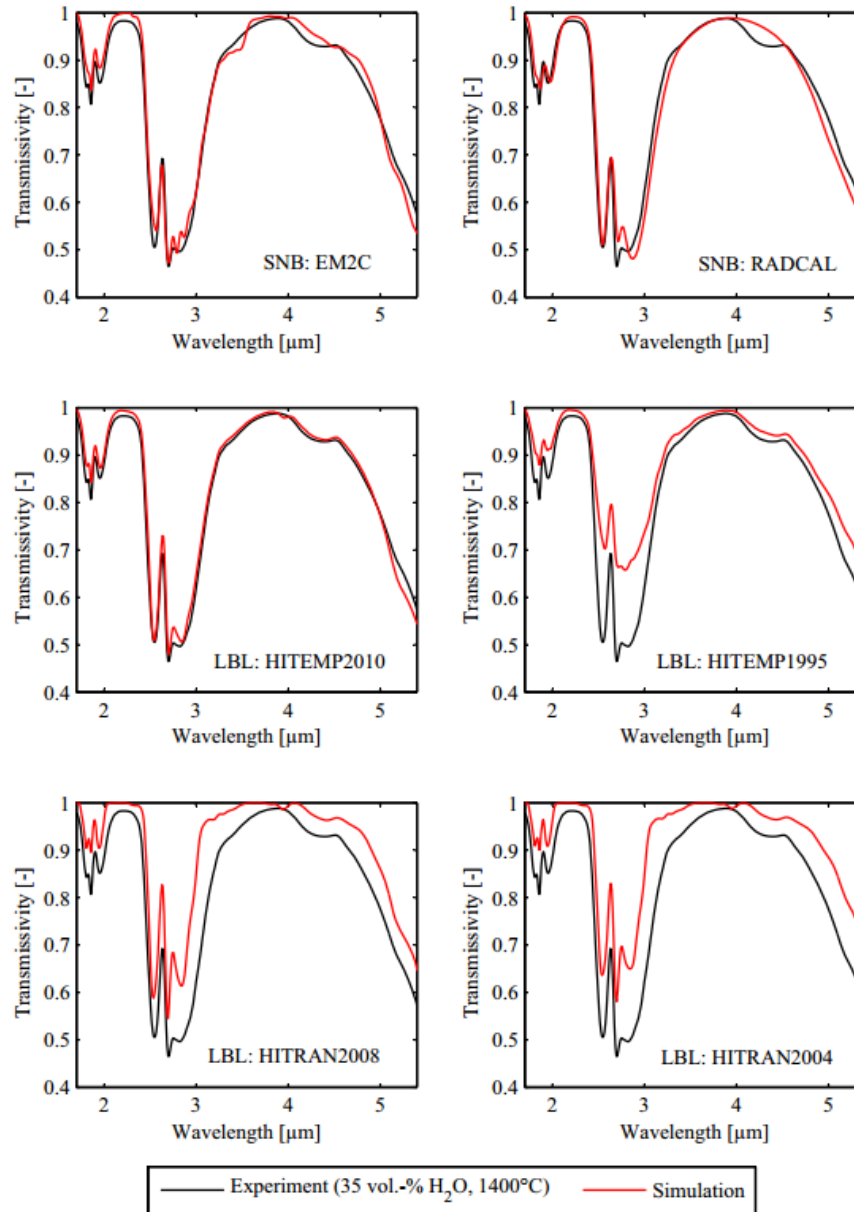
journal homepage: www.elsevier.com/locate/jqsrt

High-resolution transmission measurements of CO₂ at high temperatures for industrial applications

Vadim Evseev, Alexander Fateev*, Sønnik Clausen









Contents lists available at ScienceDirect

Journal of Quantitative Spectroscopy & Radiative Transfer

journal homepage: www.elsevier.com/locate/jqsrt

Validation of HITEMP-2010 for carbon dioxide and water vapour at high temperatures and atmospheric pressures in 450–7600 cm^{-1} spectral range

Michael Alberti^{a,*}, Roman Weber^a, Marco Mancini^a, Alexander Fateev^b,
Sønnik Clausen^b

- No need for further measurements of transmissivities of such mixtures in the 500–1770K temperature range and at atmospheric pressures.
- HITEMP-2010 can be used with confidence to generate such data.
- Transmissivity measurements are required for validation at elevated pressures up to 50 atm or perhaps 100atm.

On the accuracy of HITEMP-2010 calculated emissivities of water vapor and carbon dioxide

12th International Conference on Energy for a Clean
Environment

M. Alberti, M. Mancini, R. Weber, A. Fateev, S. Clausen

Institute for Energy Process Engineering and Fuel Technology, Technical University of Clausthal
Department of Chemical and Biochemical Engineering, Technical University of Denmark

5 – 9 July, 2015

High Pressure

Journal of Quantitative Spectroscopy & Radiative Transfer 169 (2016) 96–103



Contents lists available at [ScienceDirect](#)

Journal of Quantitative Spectroscopy & Radiative Transfer

journal homepage: www.elsevier.com/locate/jqsrt

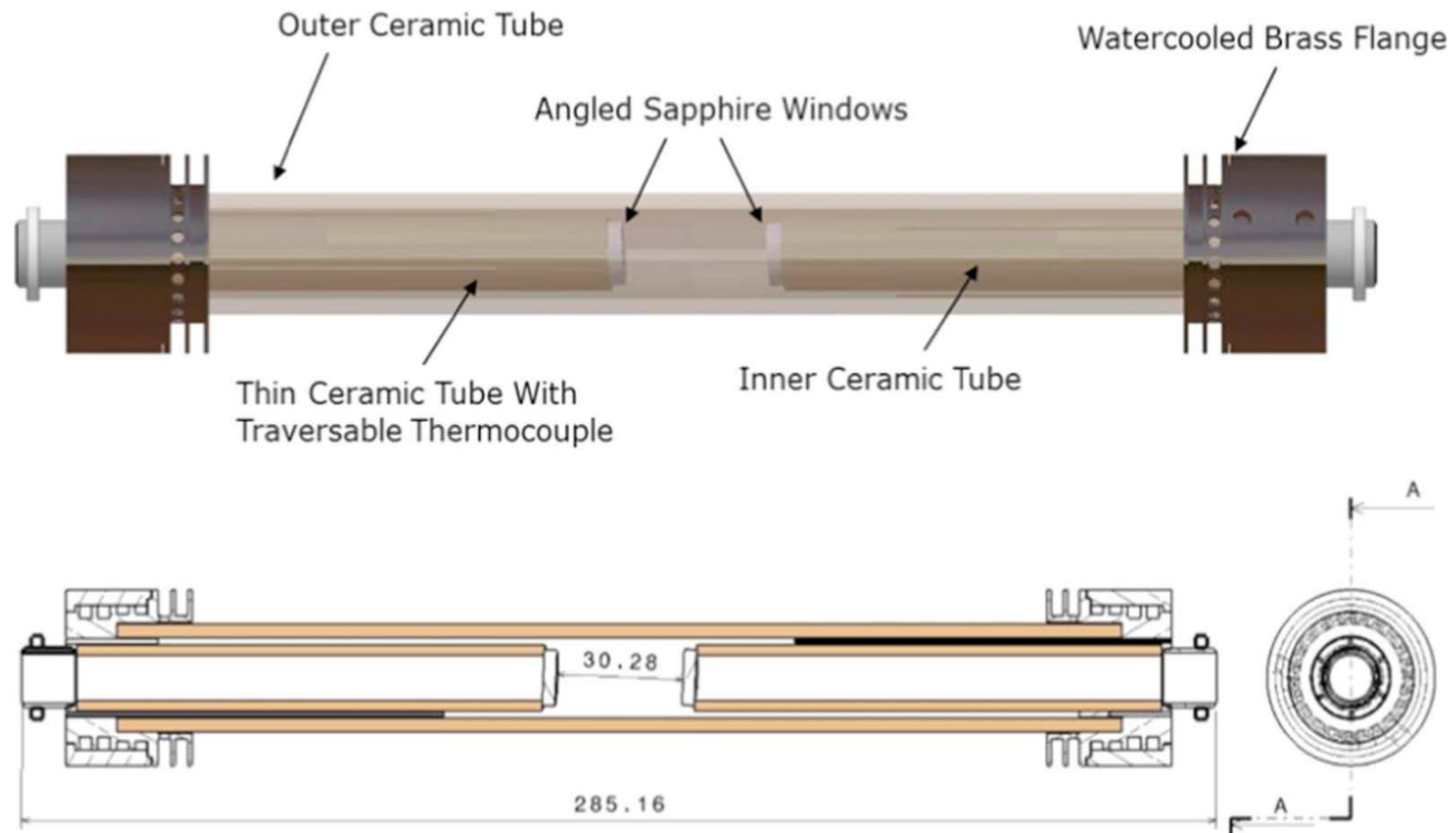
High temperature and high pressure gas cell for quantitative spectroscopic measurements

Caspar Christiansen ^a, Thomine Stolberg-Rohr ^{a,b,*}, Alexander Fateev ^a,
Sønnik Clausen ^a

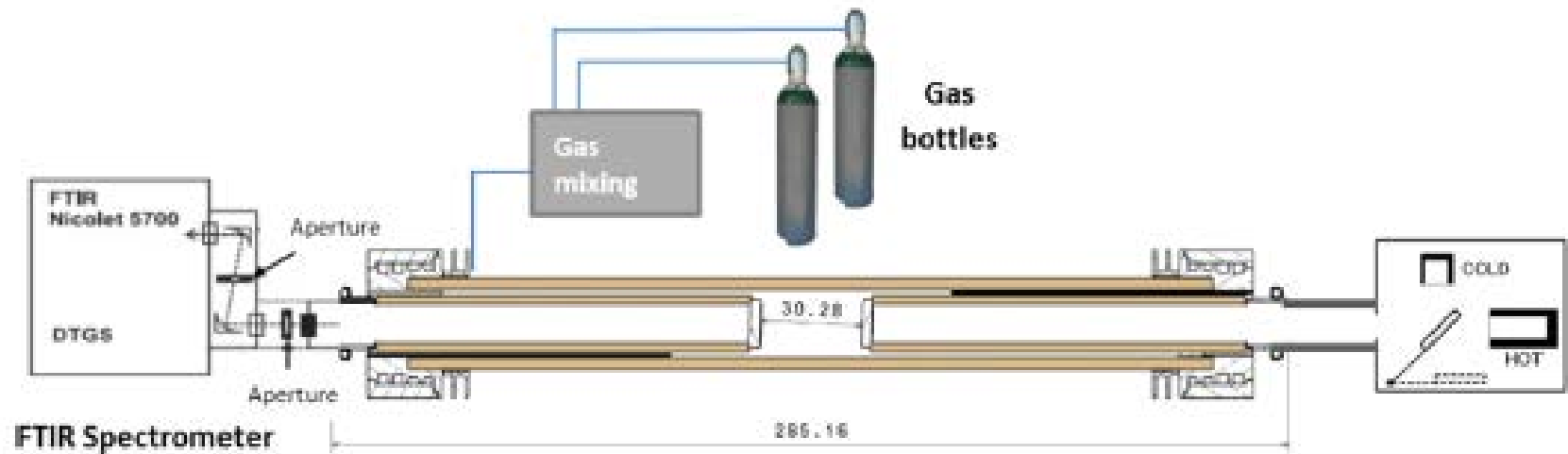
DTU Chemical Engineering

Department of Chemical and Biochemical Engineering

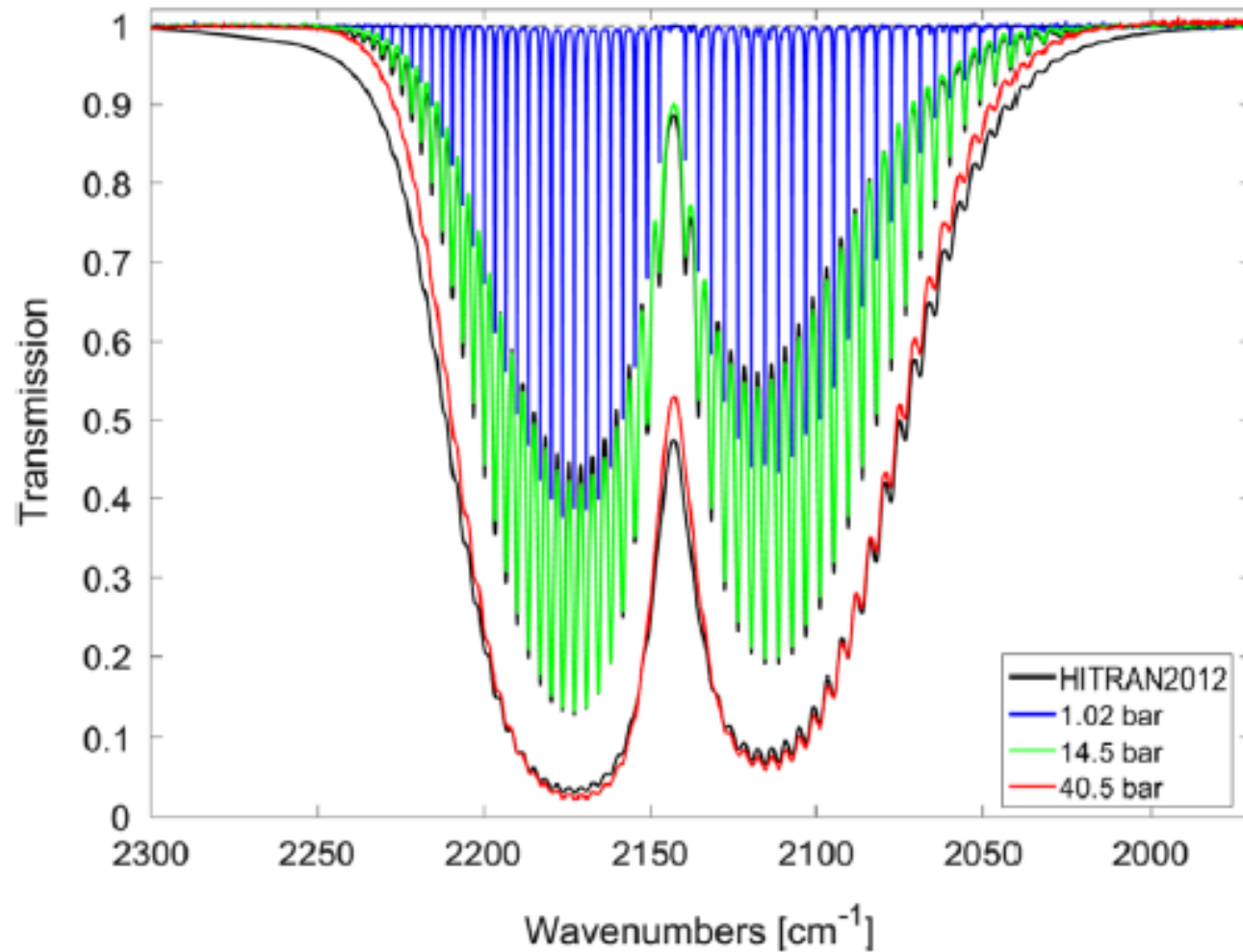
DTU NEW HIGH PRESSURE GAS CELL



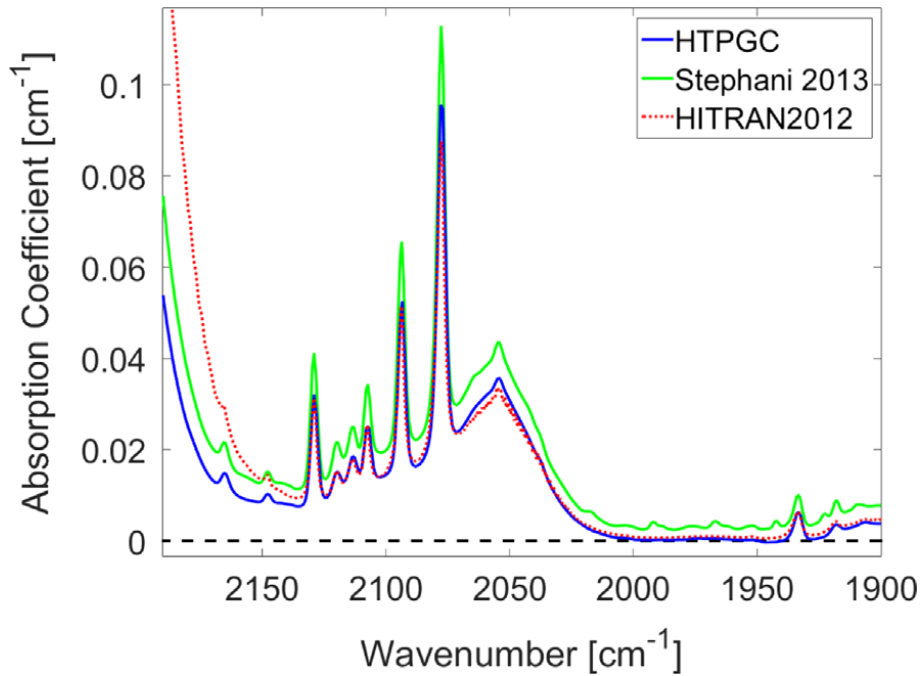
HIGH PRESSURE GAS CELL SET-UP



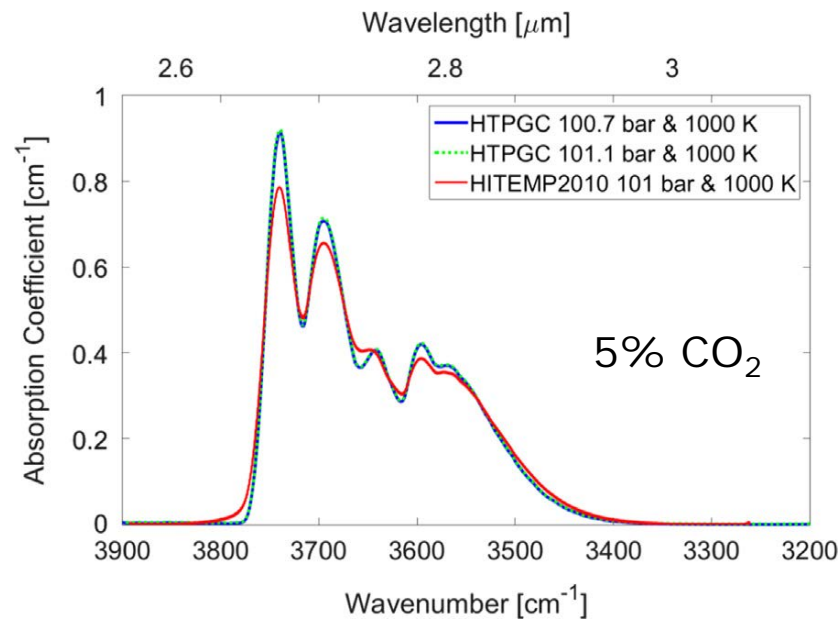
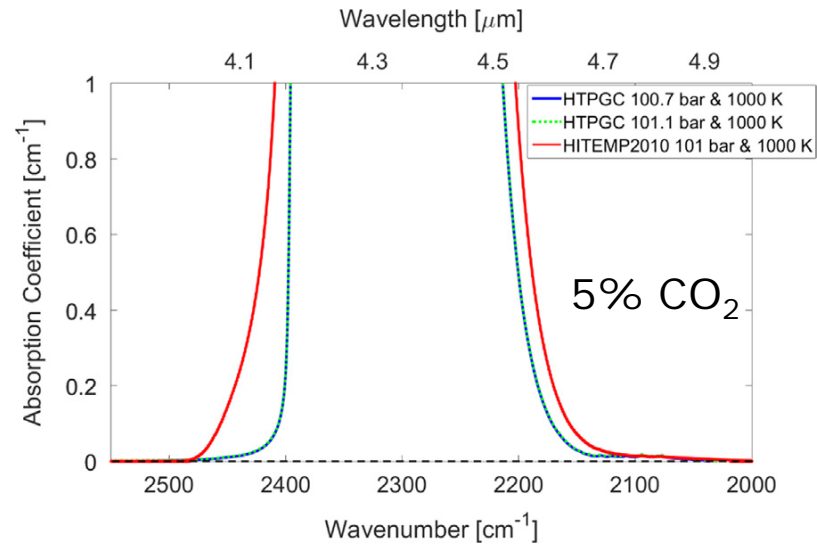
Pressure effect: CO at 1 – 40 bar



COMPARISON EXPERIMENTS and DATA BASE



100% CO₂ in N₂ at 19.3 bar and 566K



CONCLUSION:

- Data base tools has been improved since start of Radiade
- New High Pressure Gas Cell has been established at DTU
- Still (a lot) work to do at high pressure, e.g. H₂O
(very limited experimental work and complex physics)

Thank you

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+45 20 81 45 23

DTU Chemical Engineering

Department of Chemical and Biochemical Engineering
