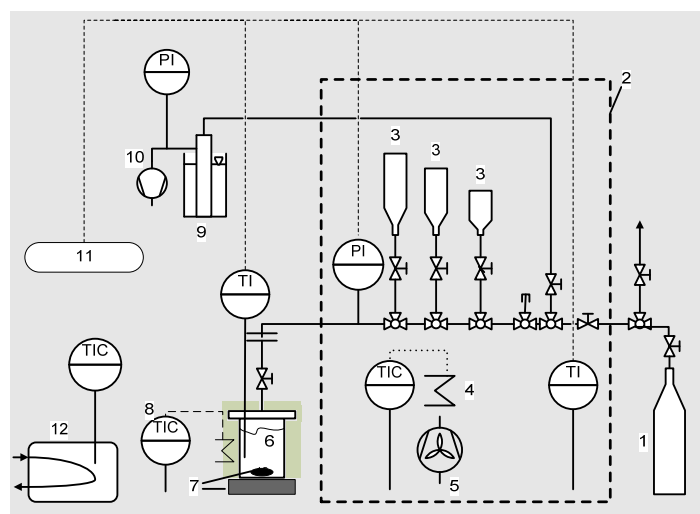


# Isochoric Gas Solubility Apparatus (GSA)

## Motivation

- Accessibility of various thermodynamic properties: Henry-constants, activity coefficients at infinite dilution, and caloric effects (e.g., enthalpy and entropy of solution of the solute at infinite dilution)
- Solubility of gases in solvents or solvent mixtures is of interest in many industrial applications, e.g., separation of gas streams (absorption, membrane processes)
- Improvement of thermodynamic models in the range of high dilution

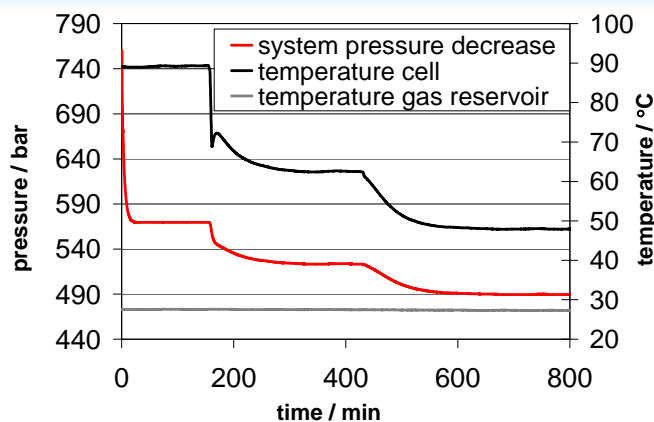
## Experimental setup



1. Gas supply
2. Air thermostat
3. 3 Gas reservoirs
4. Electrical heating
5. Fan
6. Measuring Cell
7. Magnetic stirrer
8. Heating jacket
9. Cooling trap
10. Vacuum Pump
11. Multimeter and PC
12. Oscillating tube – density meter

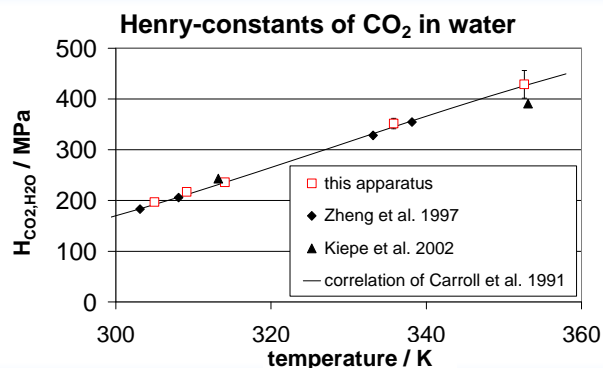
- Pressure range: 0...180 bar
- Temperature range: 20...190°C
- Isochoric method, decrease in pressure

## Data reduction

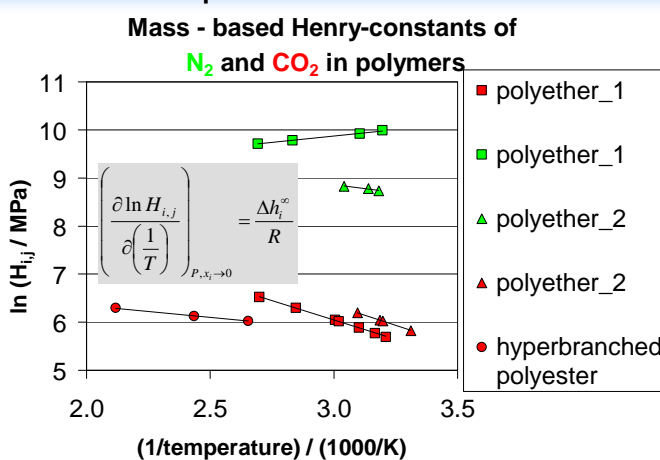


- Volumes are known (measuring cell, gas reservoir)
- Iterative calculation of amount of solved gas
- Calculated max. inaccuracies between 1...6% for Henry constants in the range of 1 to 430 MPa

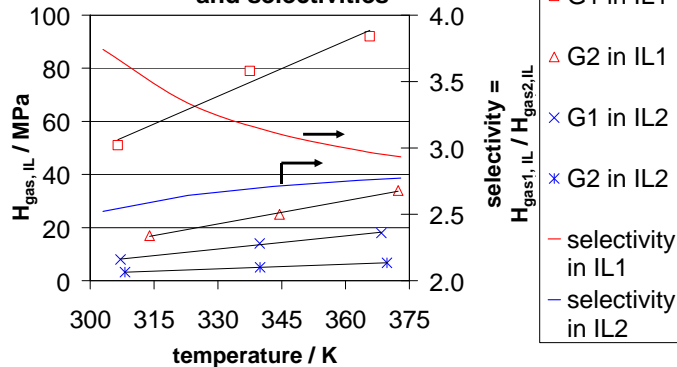
## Comparison with literature data



## Some examples



## Henry-constants of 2 gases in 2 ionic liquids and selectivities



## Solubilities of CO2 in aqueous polyether solutions @ 47°C

