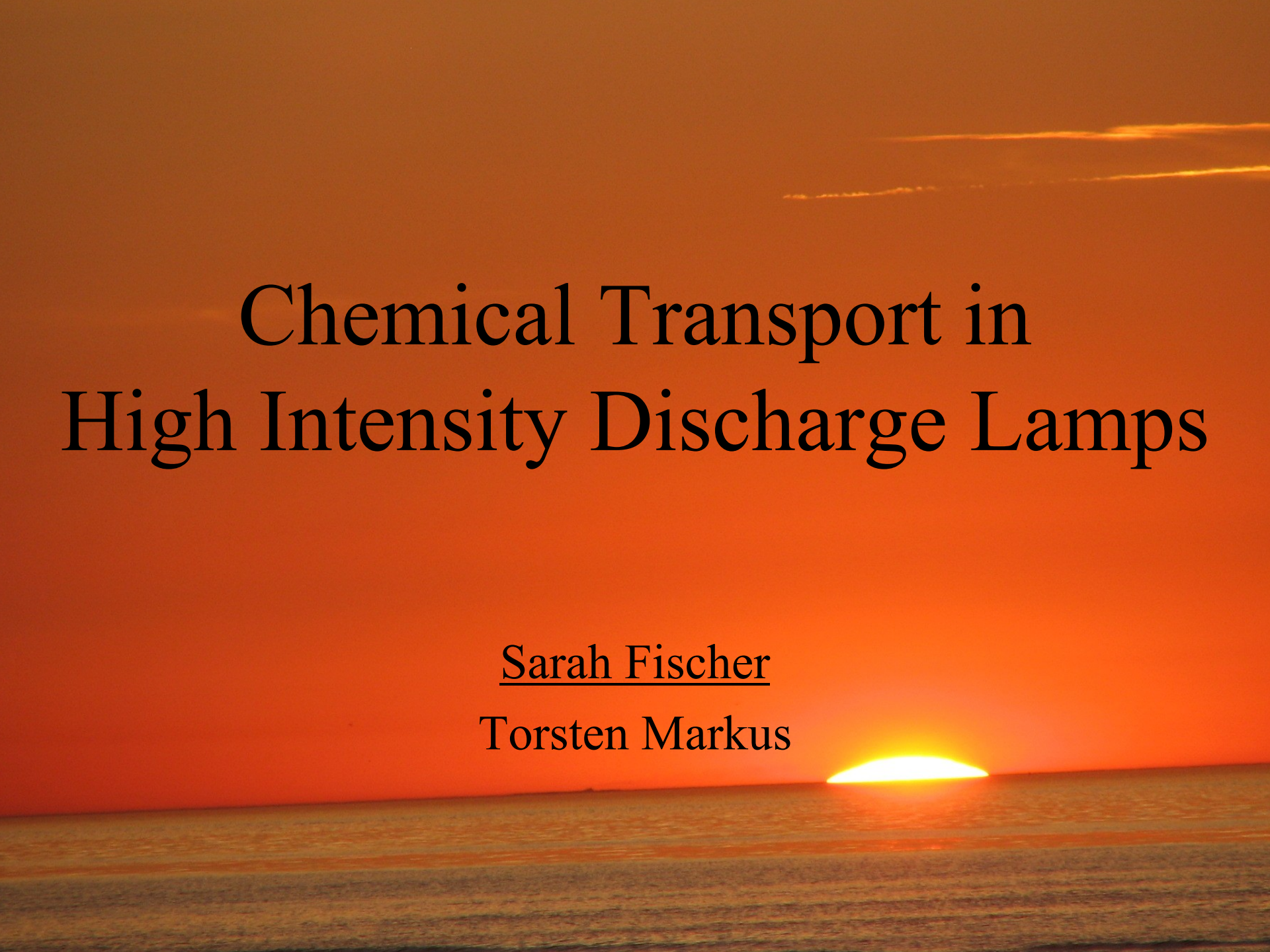


Chemical Transport in High Intensity Discharge Lamps

Sarah Fischer

Torsten Markus

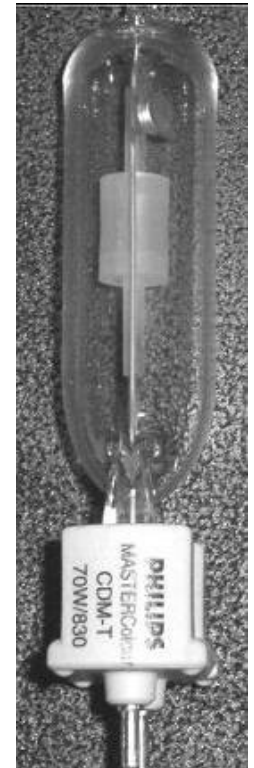


Content

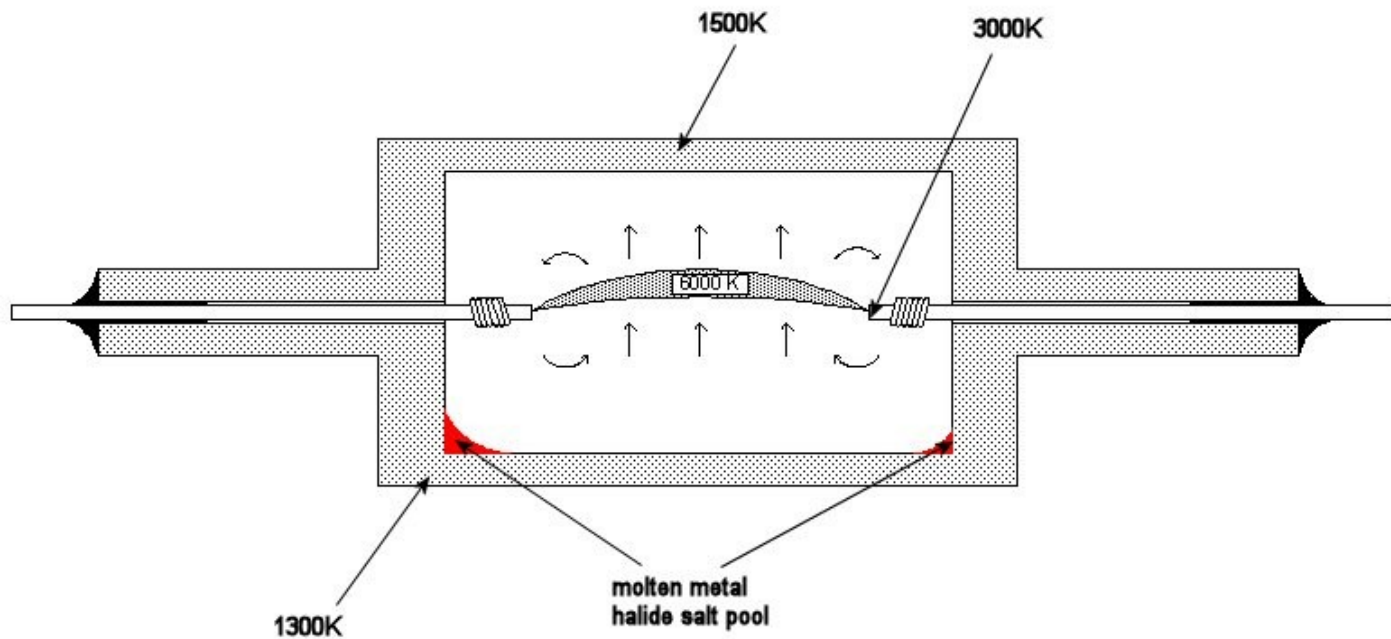
- The need of light
- The high intensity discharge lamps
- Corrosion in a lamp – burner
- Structure of the SimuSage program
- Results
- Summary



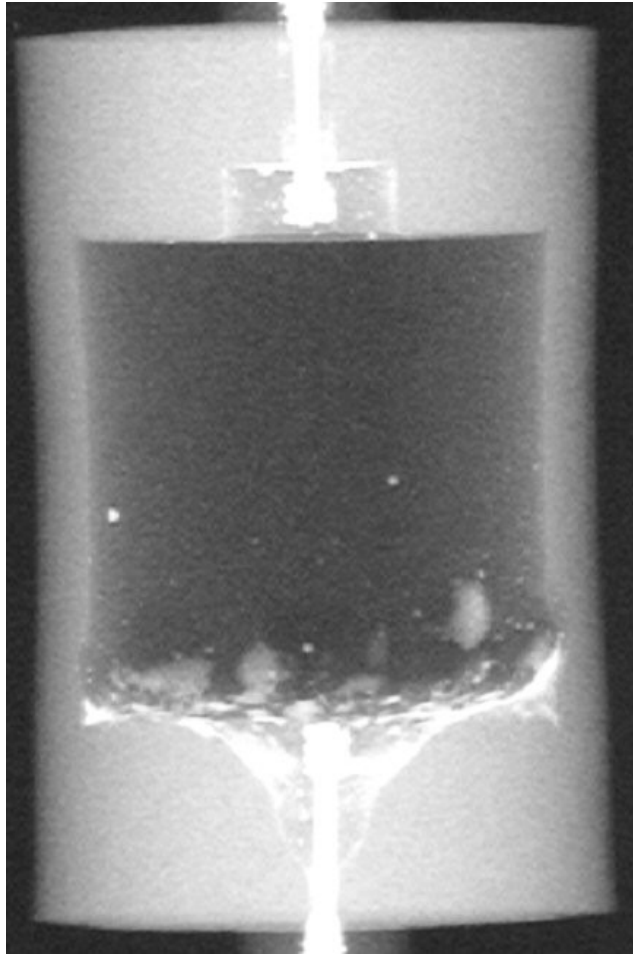
Lamps and Light



Inside a burner

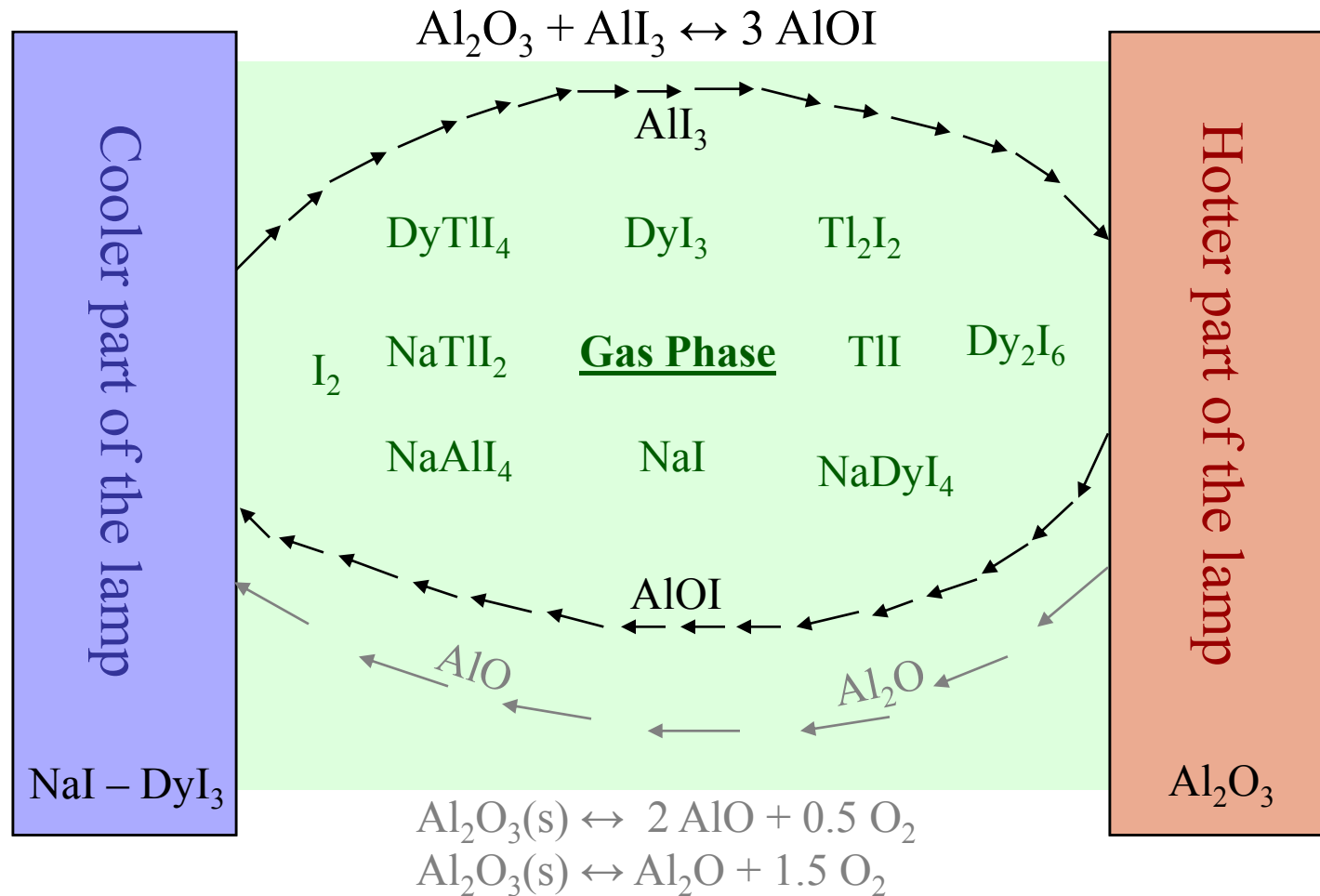


Corrosion and Destruction

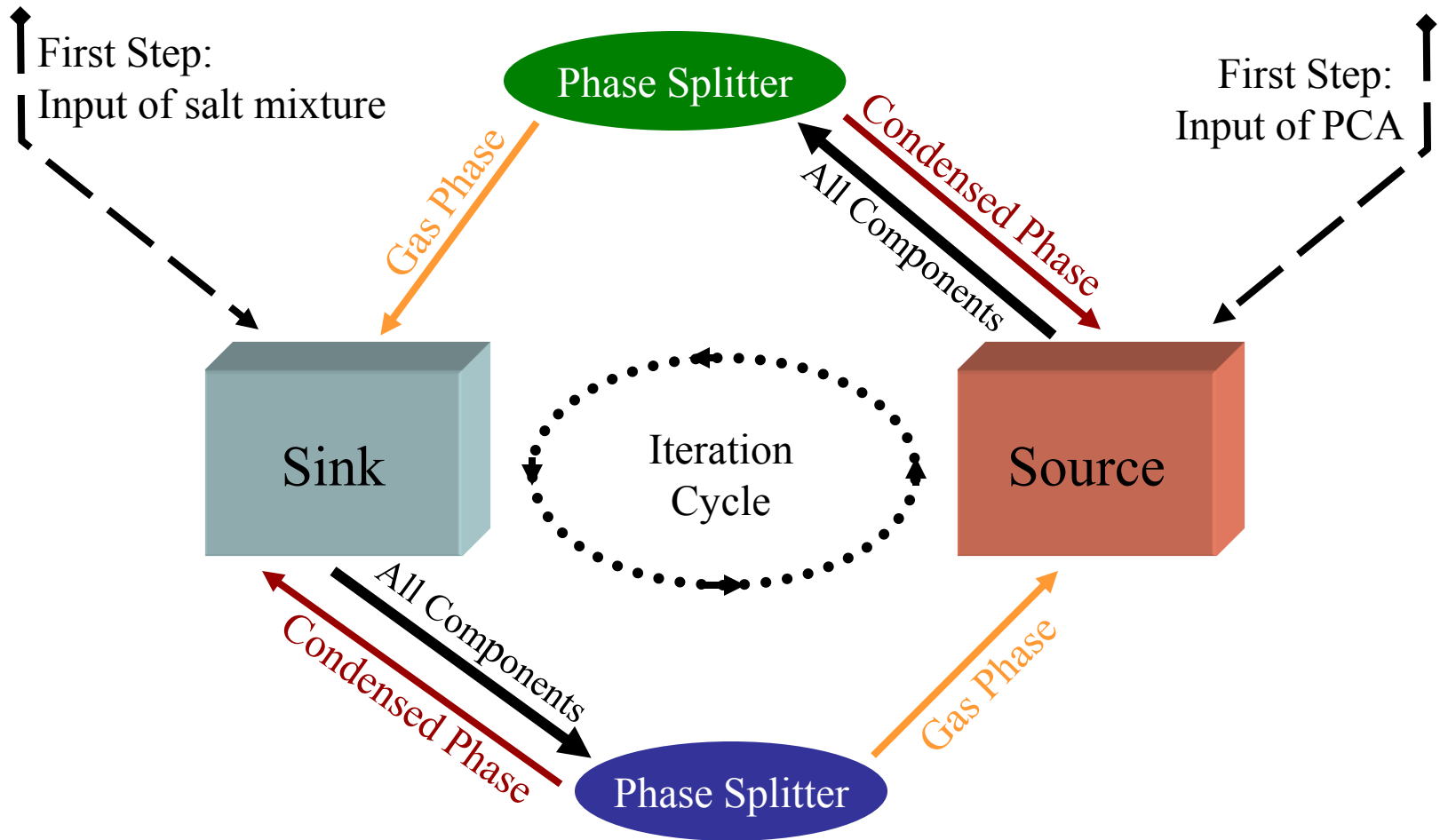


- Corrosion limits the life time
- Corrosion can change the color in the end of lamp life
- A longer life time is more economical and ecological

Simulated Chemical Cycle



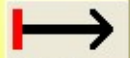
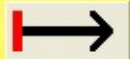
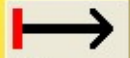
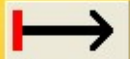
Scheme of the program



The Program

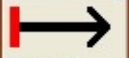
Benutzer | Admin | Transport | Gasphase1 | AllPhases | GasPhase2

Input of reactor 1

0	Mol		Al2O3_1
3E-5	Mol		Hg
3.68E-6	Mol		DyI3
3.42E-5	Mol		NaI
2.41E-6	Mol		TlI

Sarah Fischer

Input of reactor 2

1	Mol		Al2O3_2
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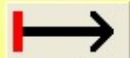
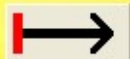
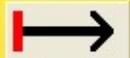
- ☐ All 100 steps a LogFile
- ☐ All 500 steps a LogFile
- ☐ Gasphase Diagram of Reactor 1
- ☐ Diagram with all phases of Reactor 1
- ☐ Diagram with all phases of reactor 2
- ☐ Gasphase Diagram of Reactor 2

 Run

The LogFiles

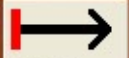
Benutzer | Admin | Transport | Gasphase1 | AllPhases | GasPhase2

Input of reactor 1

0	Mol		Al2O3_1
3E-5	Mol		Hg
3.68E-6	Mol		DyI3
3.42E-5	Mol		NaI
2.41E-6	Mol		TiI

Sarah Fischer

Input of reactor 2

1	Mol		Al2O3_2
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- ☒ All 100 steps a LogFile
- ☐ All 500 steps a LogFile
- ☒ Gasphase Diagram of Reactor 1
- ☒ Diagram with all phases of Reactor 1
- ☒ Diagram with all phases of reactor 2
- ☒ Gasphase Diagram of Reactor 2

 Run

The hidden Tab

Benutzer Admin Transport Gasphase1 AllPhases GasPhase2

0.75 = Menge von Hg in kMol

DyI3: $2\text{E}-3\text{g} = 3.68\text{E}-6\text{mol}$

0.25 = Menge von DyI3 in kMol

NaI: $5.2\text{E}-3\text{g} = 3.42\text{E}-5\text{mol}$

0.11 = Menge von NaI in kMol

TI: $8\text{E}-4\text{g} = 2.41\text{E}-6\text{mol}$

0.17 = Menge von TI in kMol

Iterator  Reactor 1 100
Strom8gas

Iterator  Reactor2 0
Strom9all

Alle Eingabe Ströme ->  VorMischer  Reactor 1
Strom1all

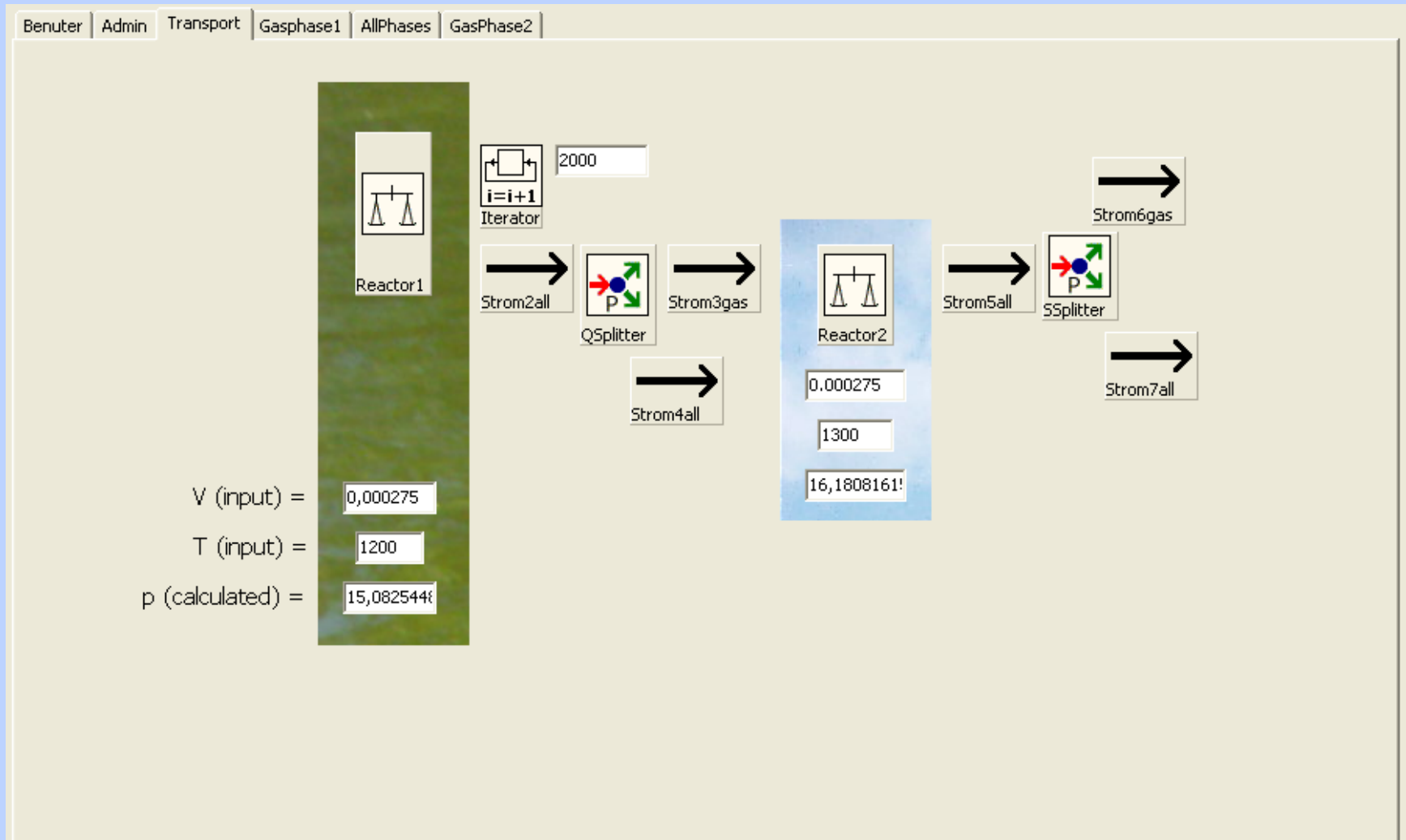
2.25 = Menge von Al2O3 [kMol] in Reaktor 1

2.35 = Menge von Al2O3 [kMol] in Reaktor 2

 Exit  Inspector

09:53:34: C:\Dokumente und Einstellungen\sfischer\Eigene Dateien\Borland Studio-Projekte\CMD-1.1\Project1.exe started.
09:53:34: SimuSage version is 1.8.0 (Build 18) for Borland Delphi 2005, ChemApp version is 5.3.8
09:53:34: ChemApp DLL loaded from: C:\WINDOWS\system32\ca_ssfd.dll
09:53:34: SimuSage is licensed to 5222/Forschungszentrum Juelich, IWV 2
09:53:34: SimuSage license expires on 30.6.2007
09:53:34: Path for .ssd files is C:\Programme\GTT-Technologies\SimuSage\Delphi2005\V1\ssd\

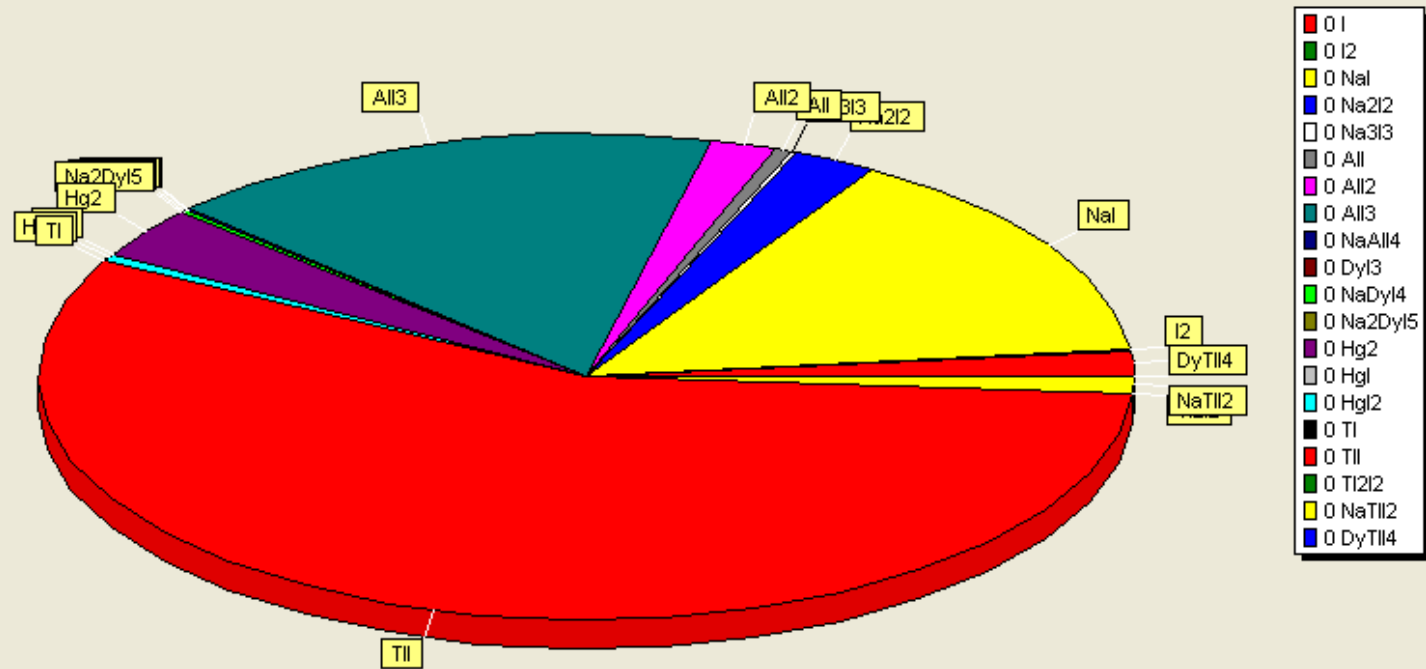
Chemical Cycle



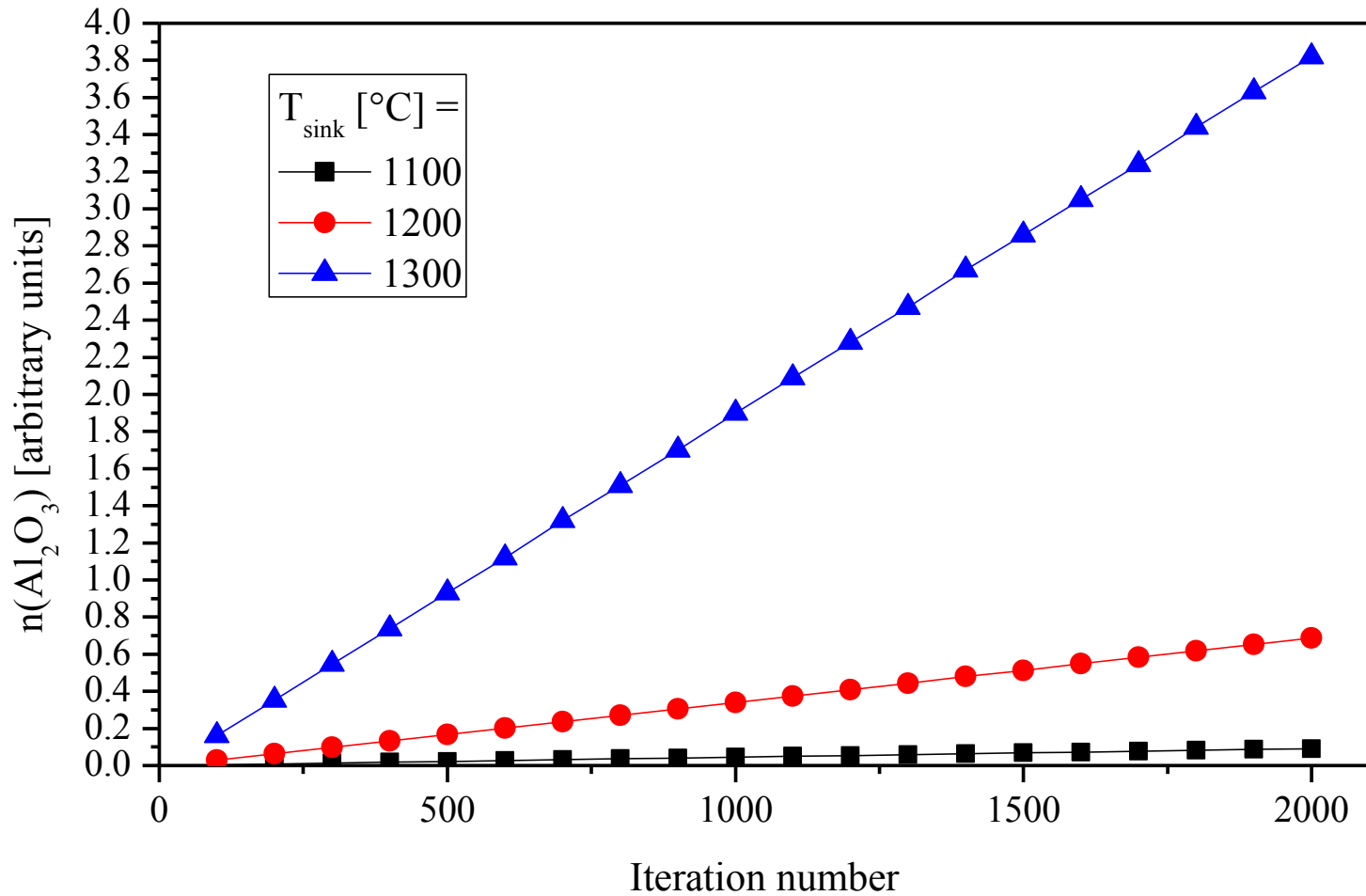
Gas-phase of the sink

Benuter | Admin | Transport | Gasphase1 | AllPhases | GasPhase2 |

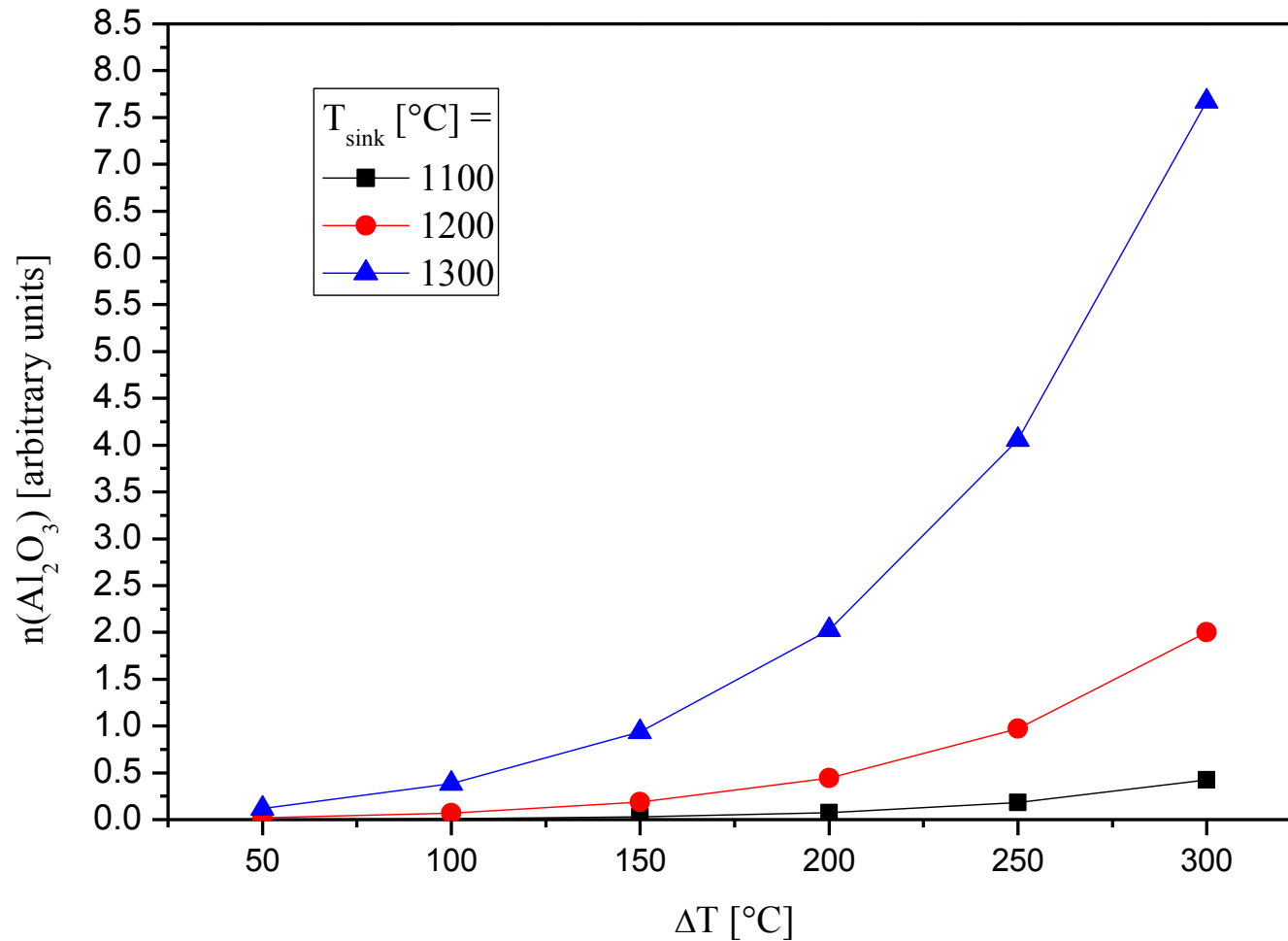
Only gas-phase out of reactor 1



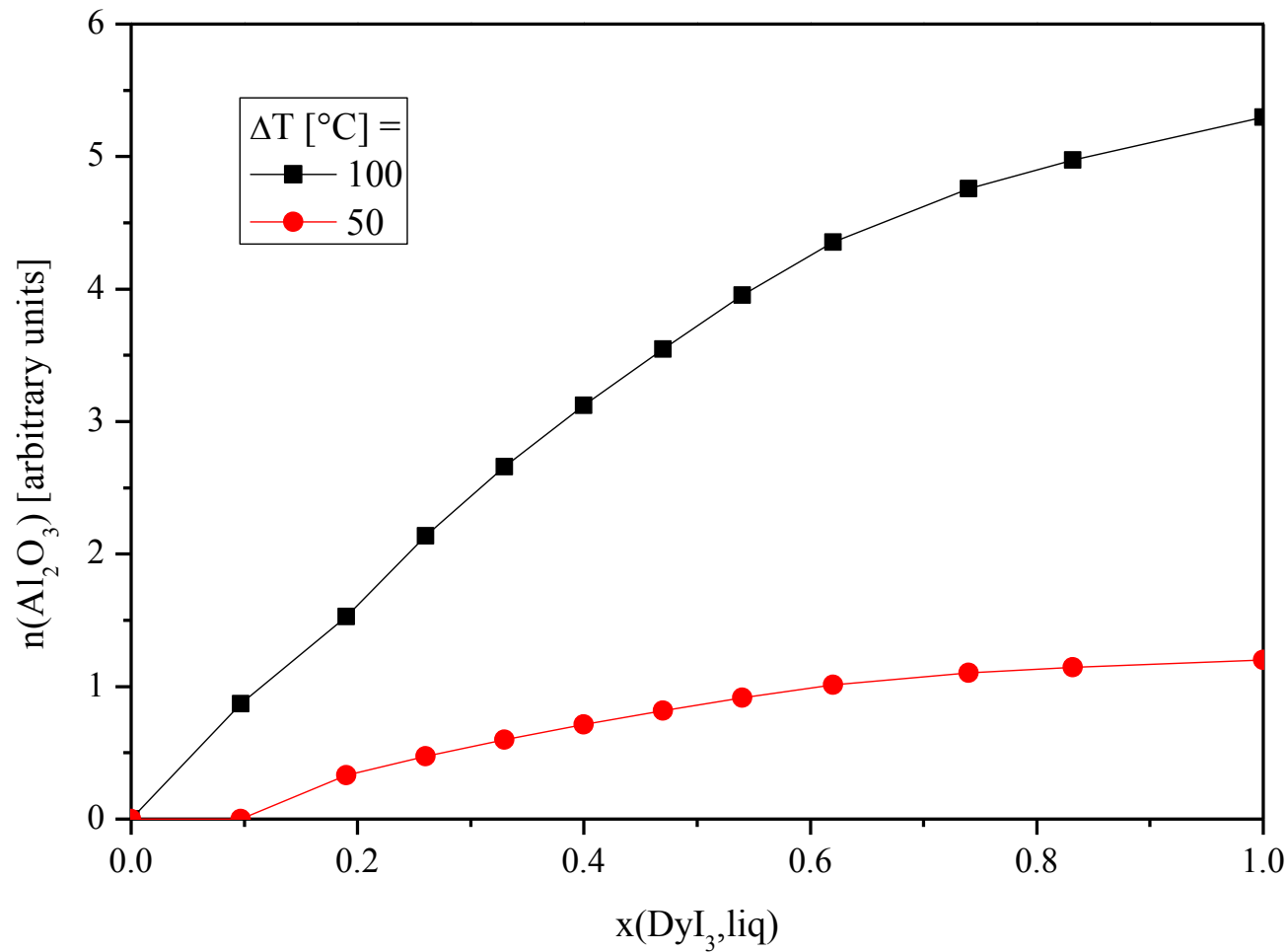
Temperature dependence



The temperature difference



The salt pool



Summary

- HID – lamps are mainly used in big buildings
- HID – lamps have a long life time
- Corrosion effects limit the life time
- Equilibriums can be calculated isochore
- Corrosion depend on the temperature
- Salt pool has a very sensitive influence

The background of the slide is a photograph of a sunset or sunrise. A large, bright sun is positioned on the left side, partially obscured by a soft, yellowish glow. The sun's light reflects on the surface of the water at the bottom of the frame. The sky is a deep orange color, and the water is a darker, calm surface.

Thanks for your attention