

**Deuterium (Hydrogen) Flux Permeating Palladium
and
Condensed Matter Nuclear Science**

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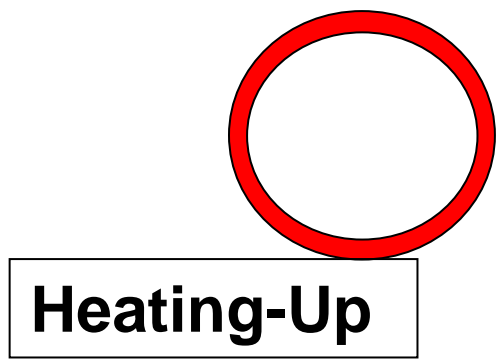
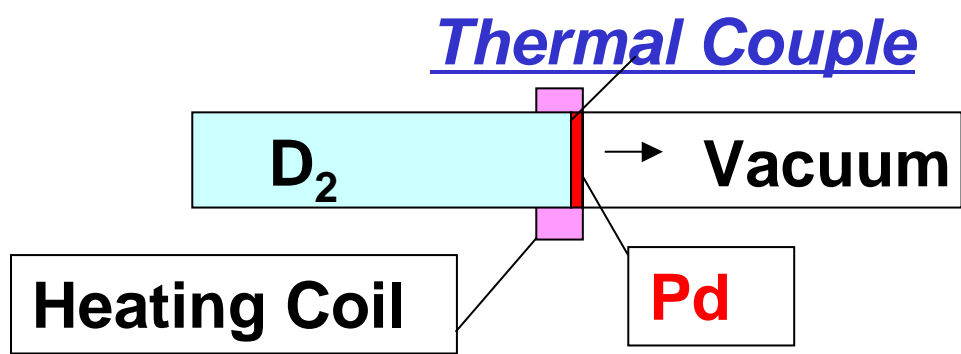
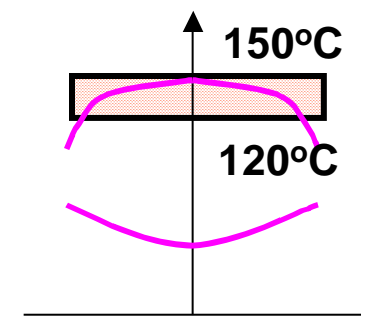
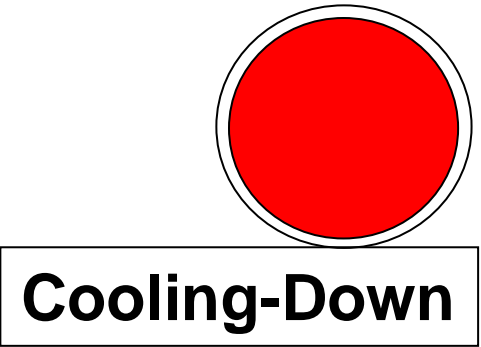
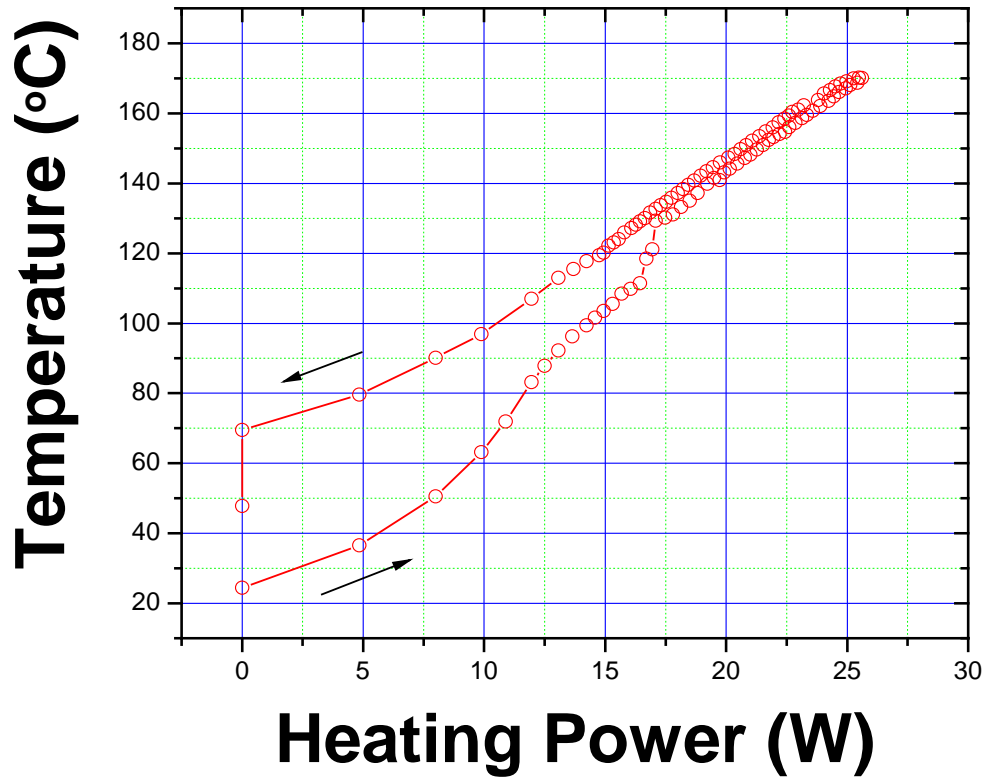
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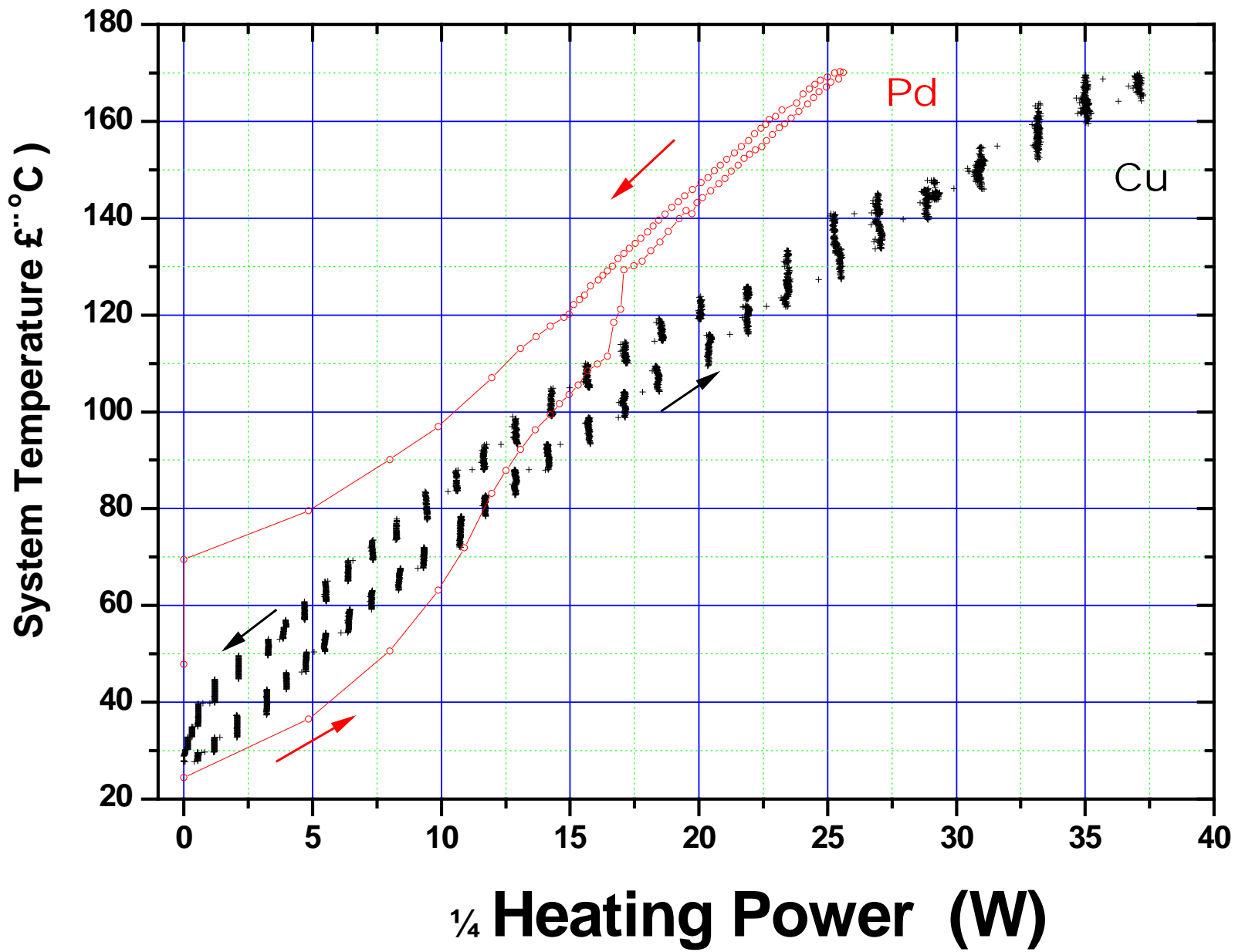
Jian Tian

**Life Science School, ChangChun University of Science and
Technology, ChangChun, CHINA**

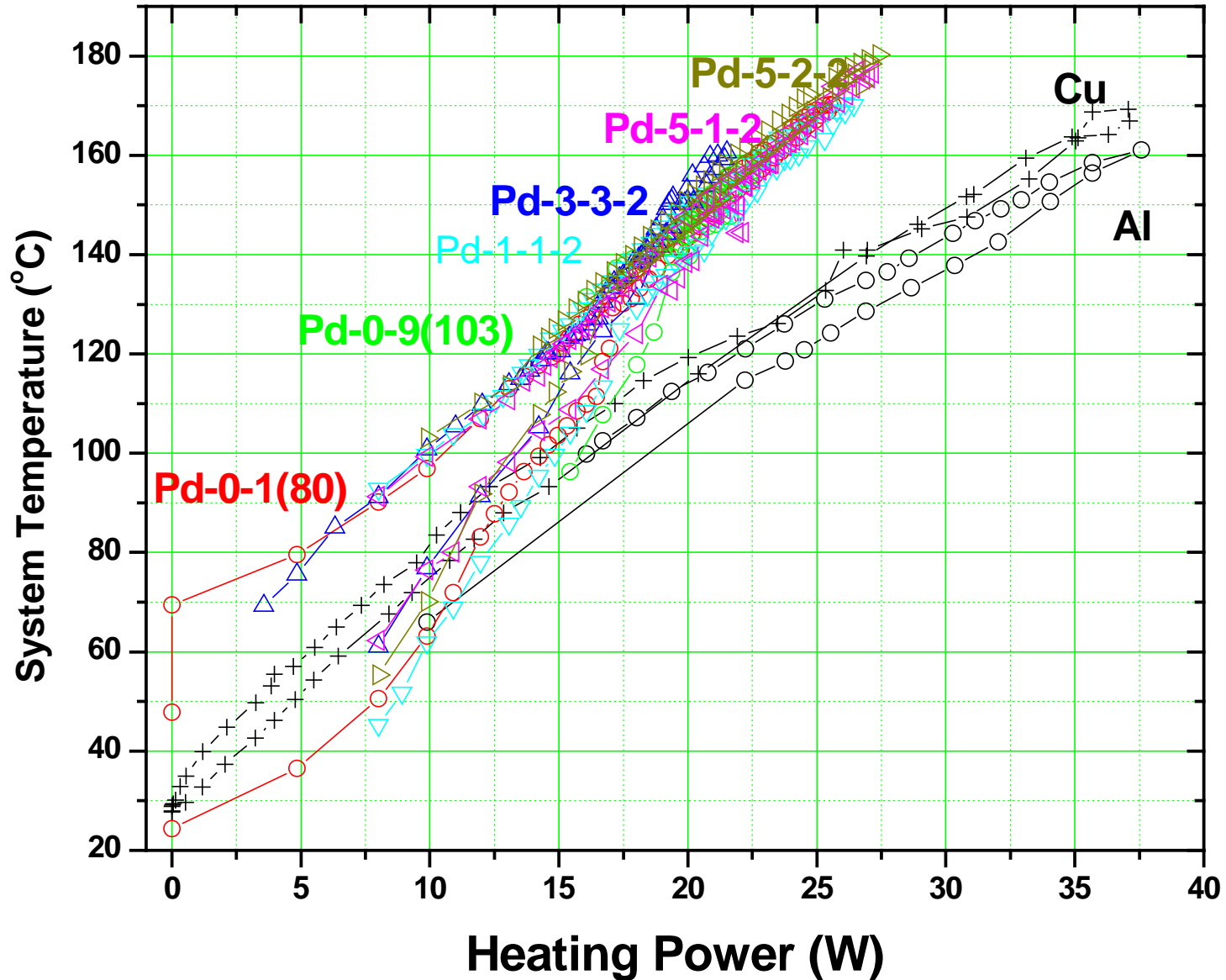
Hysteresis in Temperature versus Heating Power



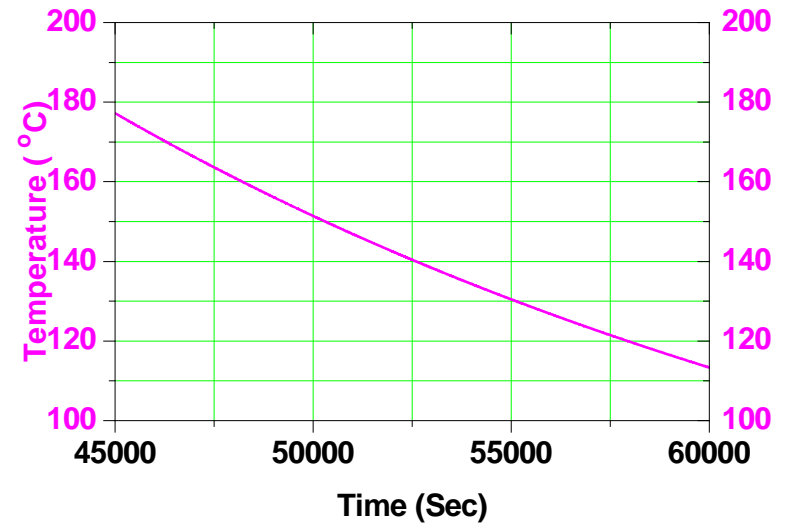
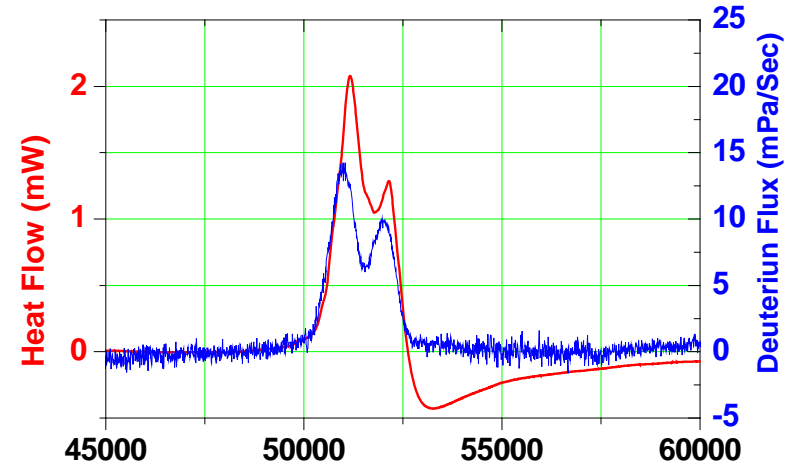
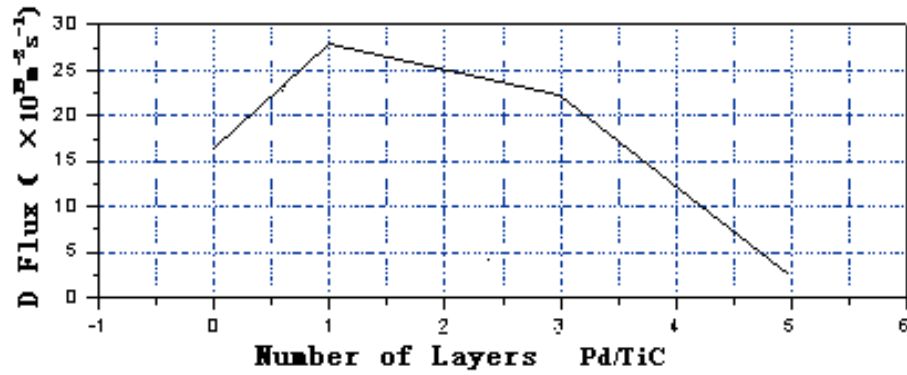
Calorimetry : "Excess Power" 6 --> 10 W



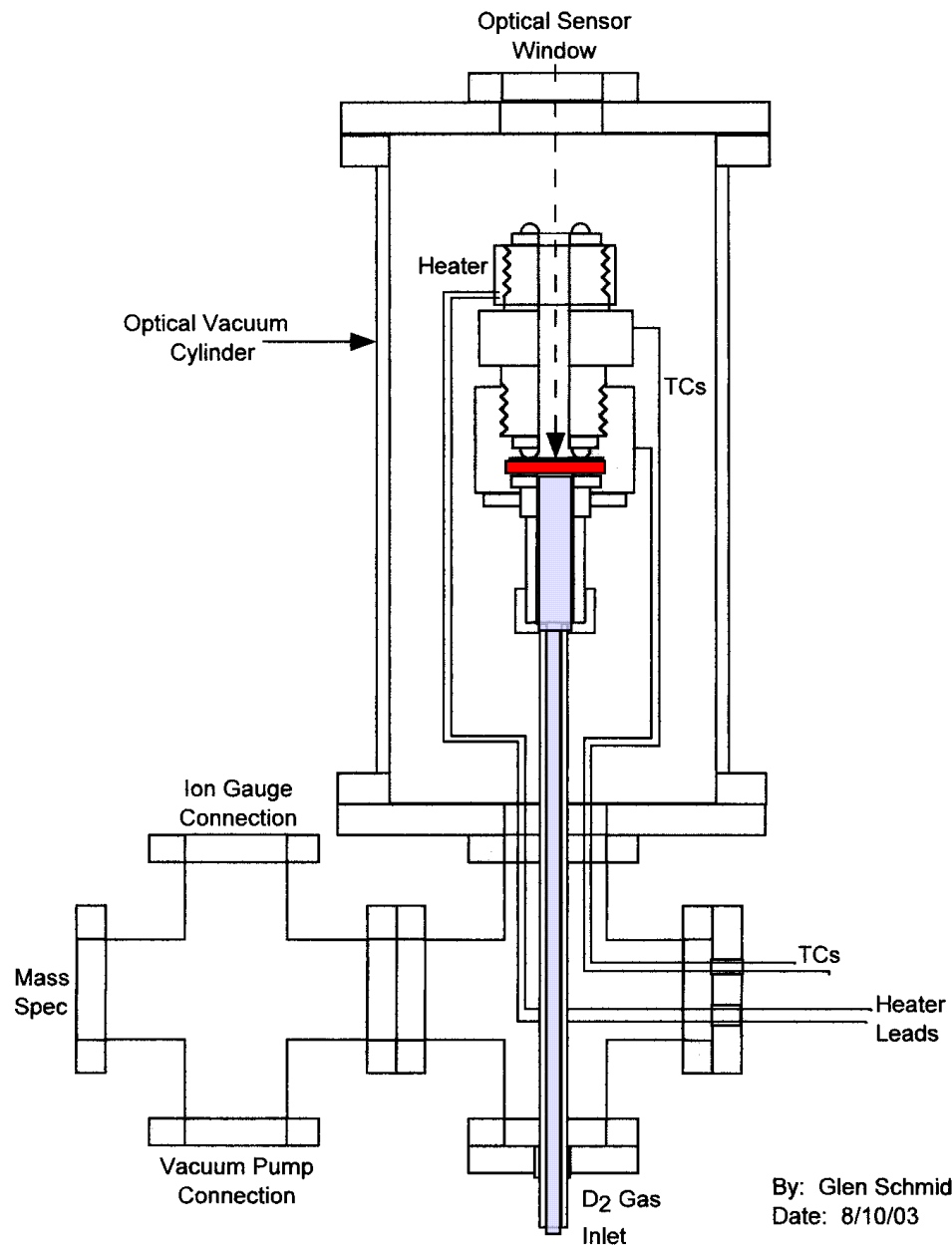
Reproducibility of Temperature Jump in Pd Film



Wave Nature of D Flux



HEAT LI's Test Setup-1 Layout

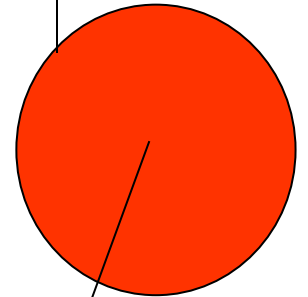


By: Glen Schmidt
Date: 8/10/03

Deuterium Flux and Heat Flow

	No D ₂	D ₂ Filled
Heating Power (W)	214 W	197 W
T _{center} (°C)	100.6	109.4
T _{edge} (°C)	100.9	99.26

T_{edge}



T_{center}

T₂ ???

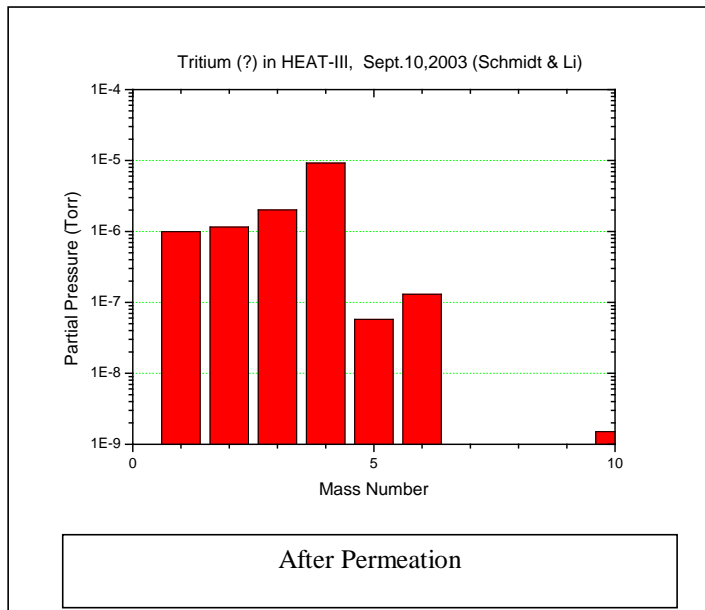
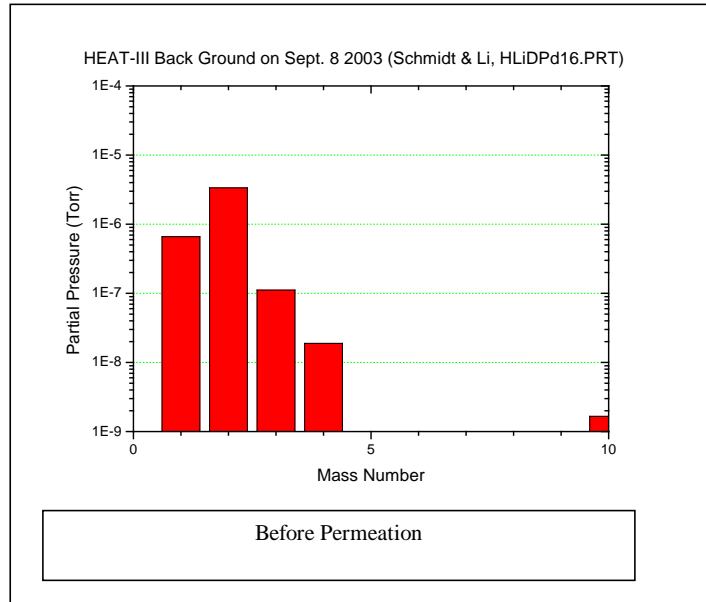
Mass 6 ?

D₃ ? >1%,

Not in B.G.

⁶Li ? No ⁷Li ?

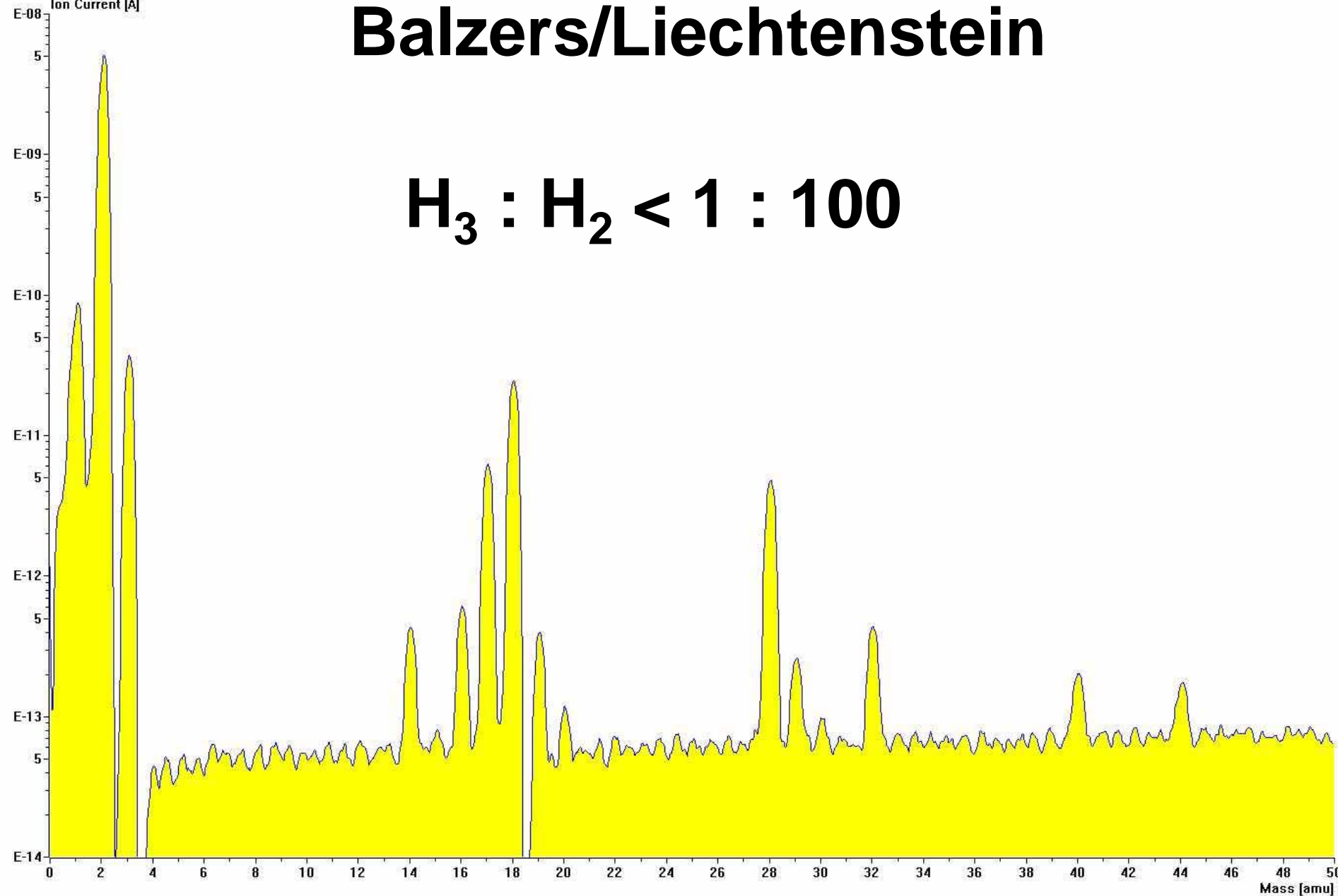
¹²C⁺⁺ ? ¹²C⁺ ?

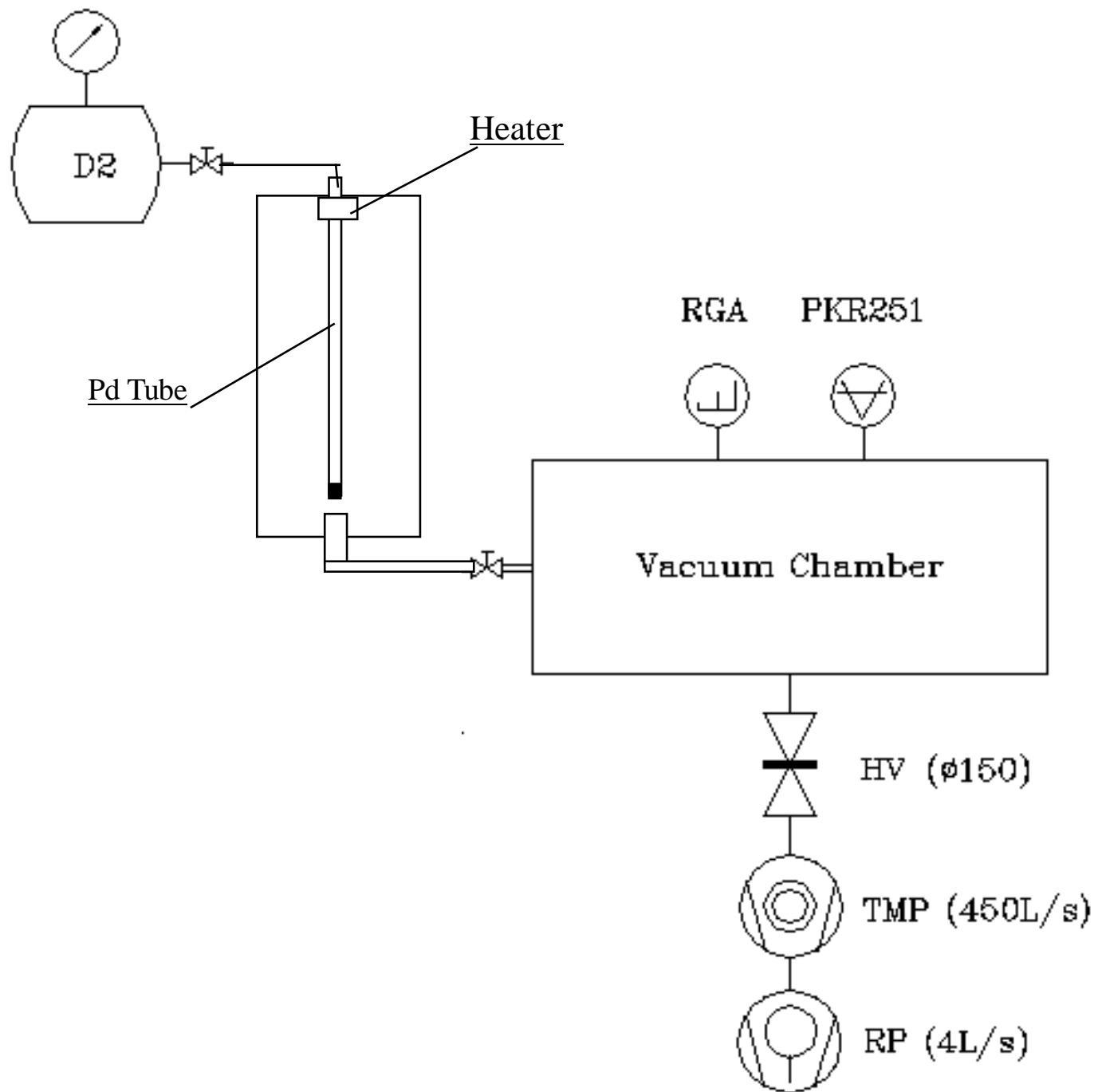


Balzers/Liechtenstein

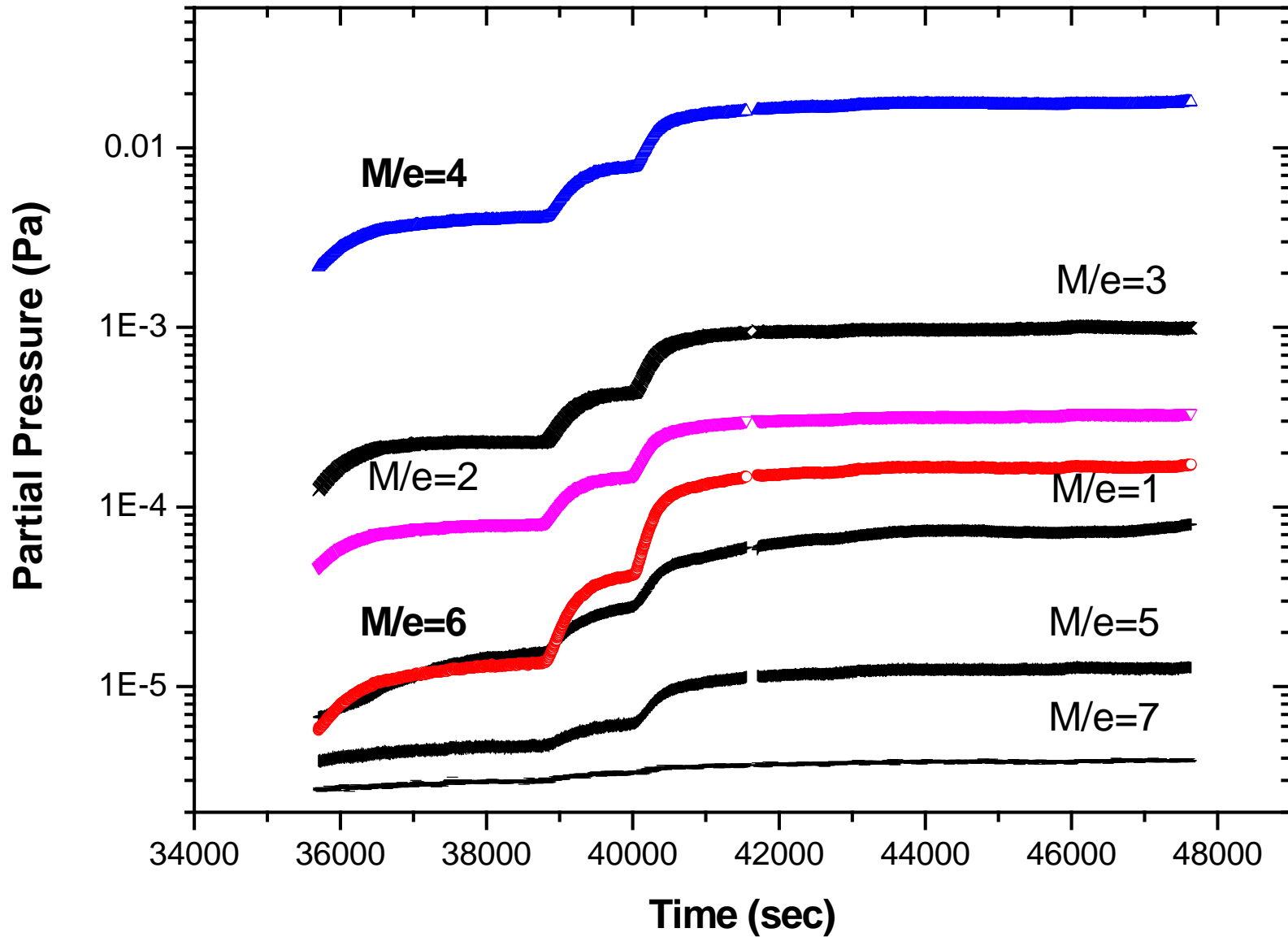
$H_3 : H_2 < 1 : 100$

Scan #1
Ion Current [A]

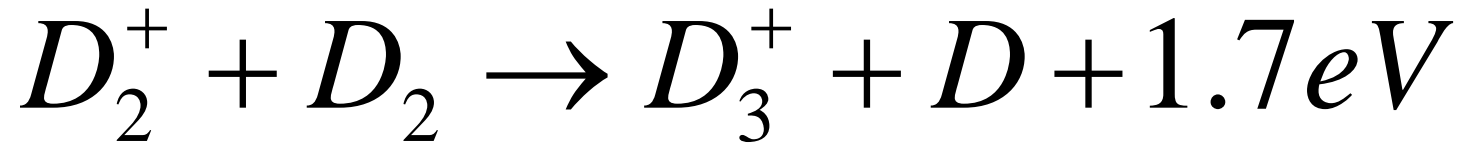




Mass 1-7 varies with time ($D_2 + Pd$, 2004-7-7)

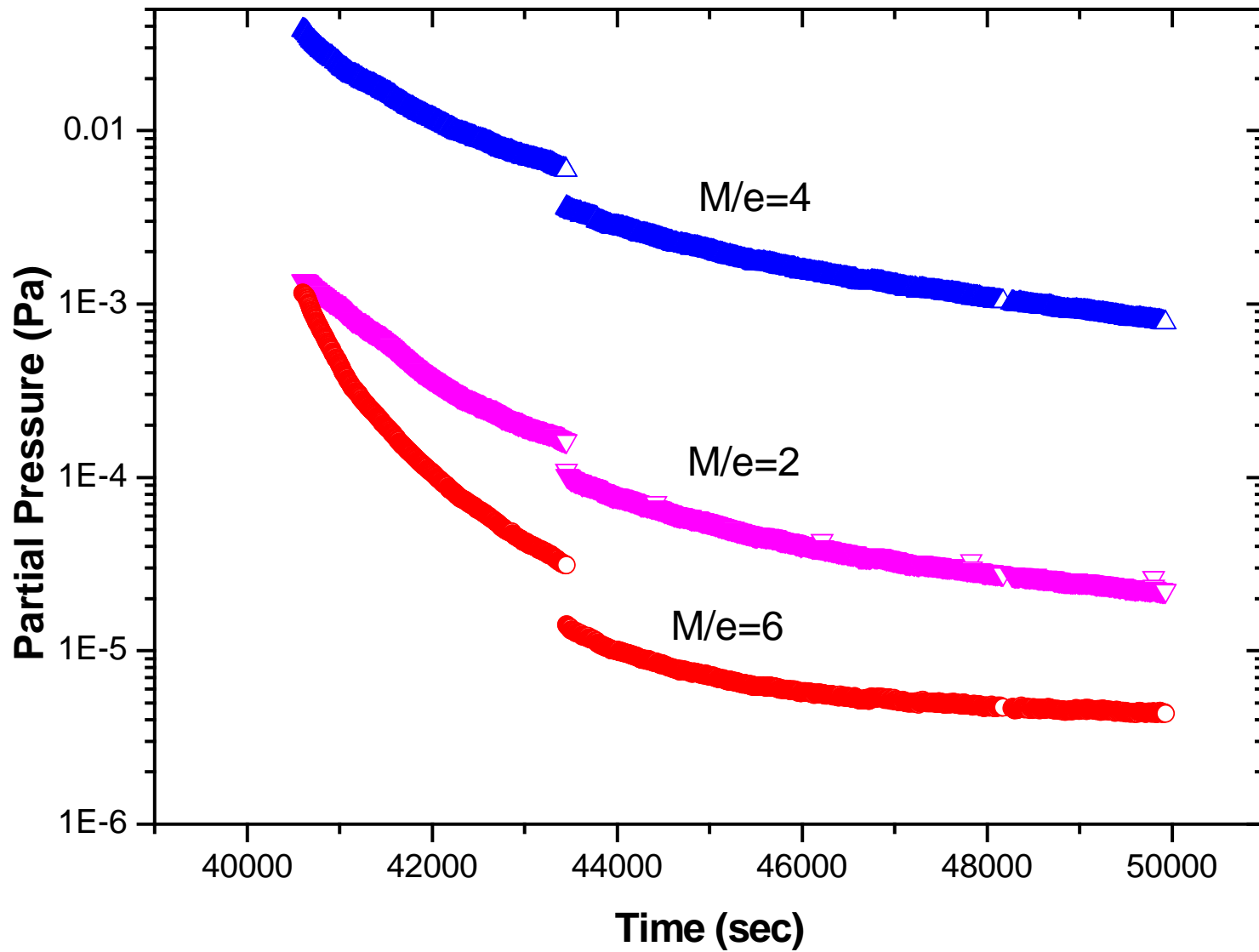


Langevin Rate in Mass Spectroscopy

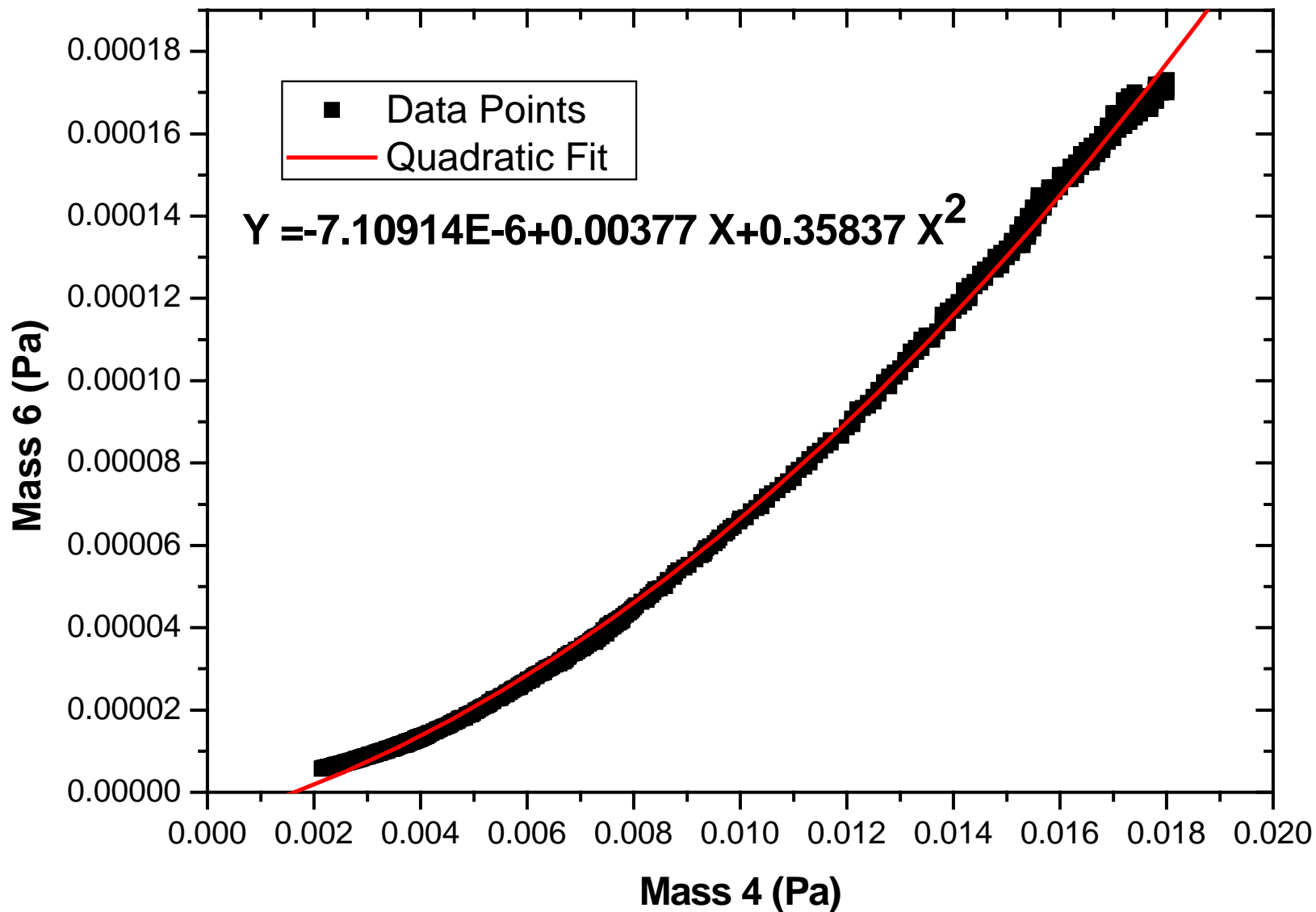


- D_3 is unstable, but D_3^+ is stable
- D_2^+ ion polarizes neutral D_2 , and Traps D
- Quadratic feature with Mass 4
- Exothermic Reaction

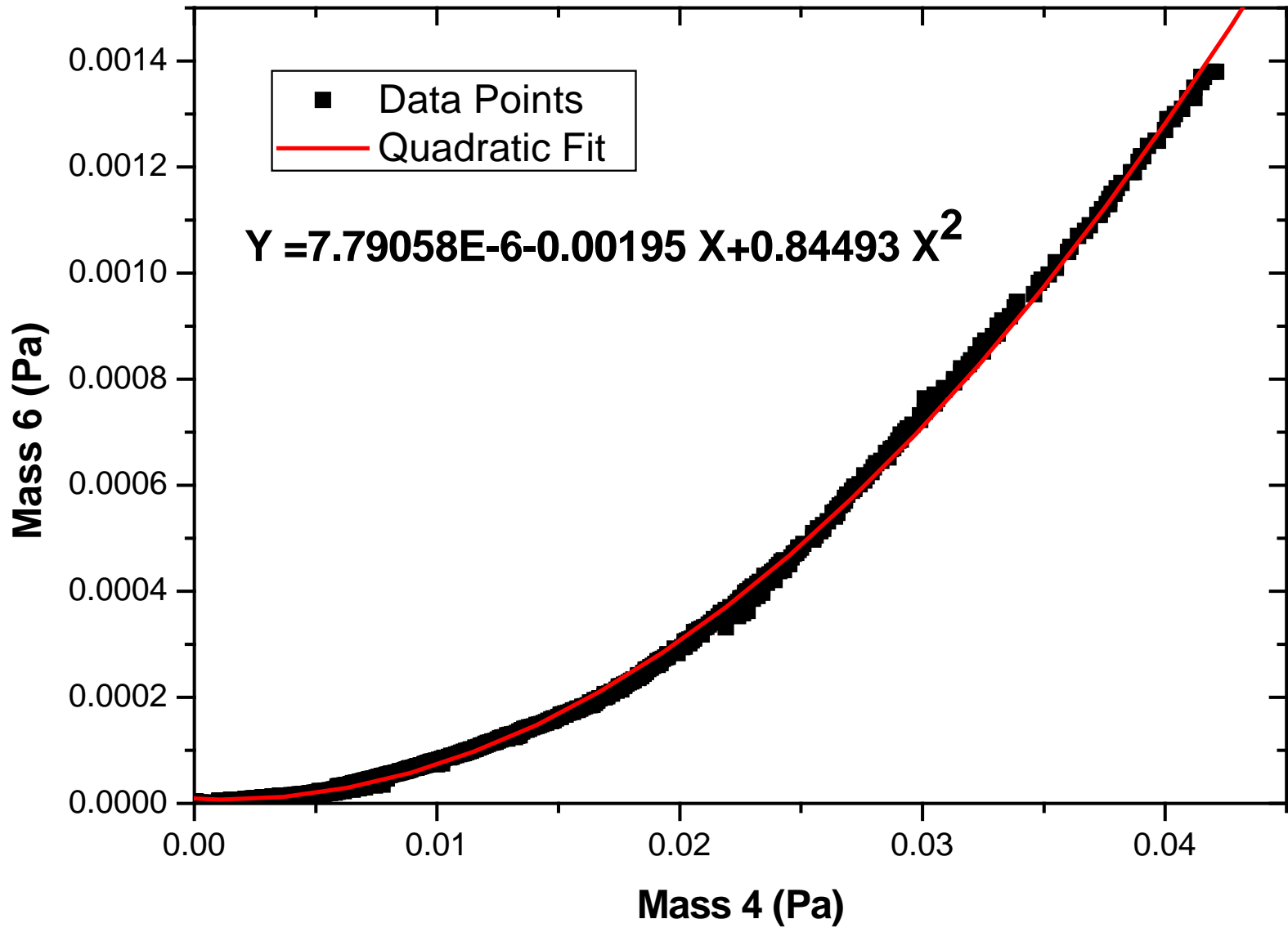
D₂ without Pd, 2004-7-12



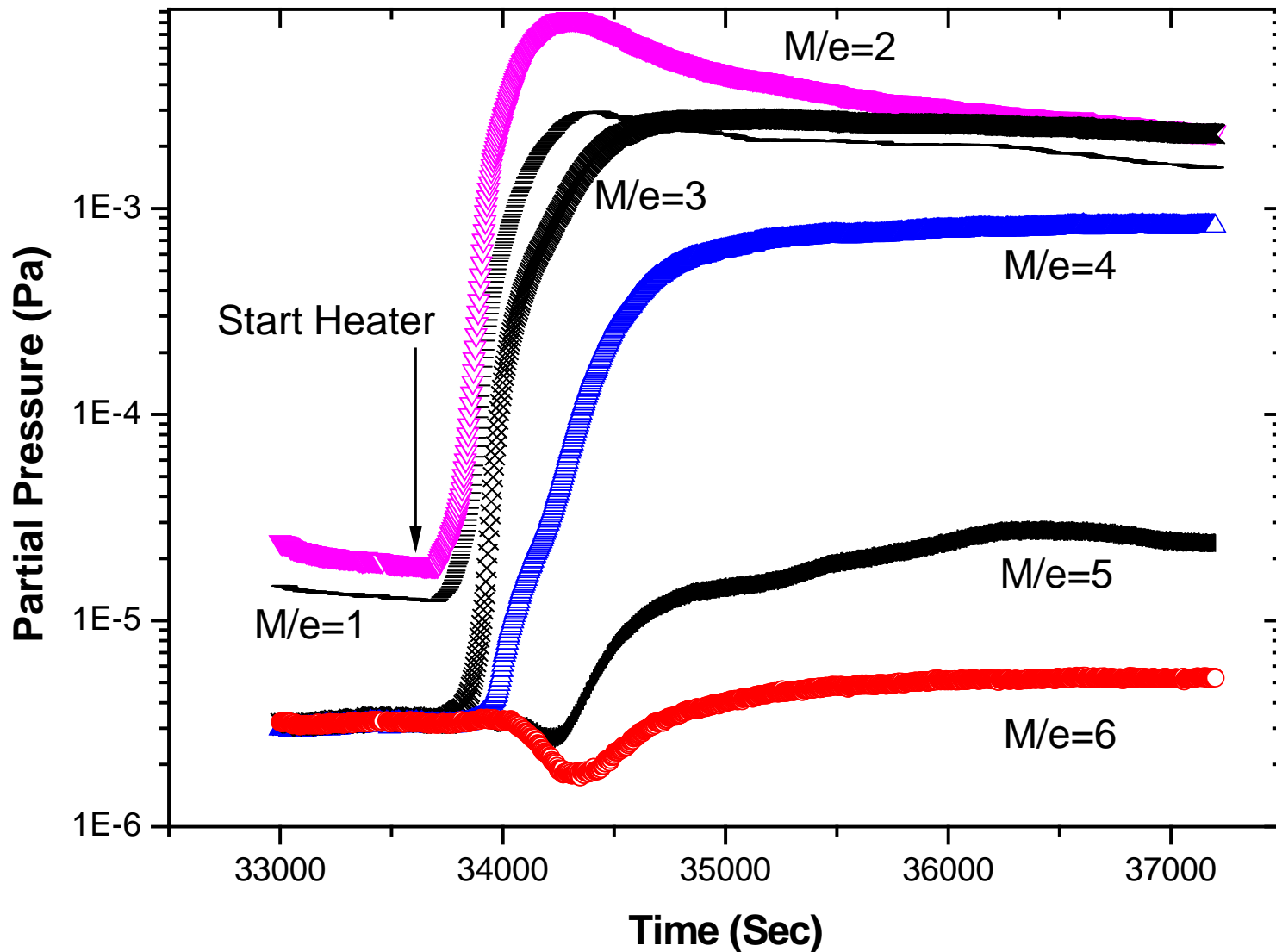
D+Pd, 2004-7-7



D₂ without Pd, 2004-7-12



H+D+Pd, 2004-7-19, M6 decreases while M4 increases



Concluding Remarks

- **Detection limit of mass spectrometer : 10^{-7} Pa \rightarrow
 10^{-12} Pa;**
- **Combined time-of-flight mass spectrometer with laser stimulated fluorescence spectrometer to distinguish T_2^+ from D_3^+ .**

Confirmation of Tritium Production

1. Bockris

2. DOE

3. Claytor

4. Will

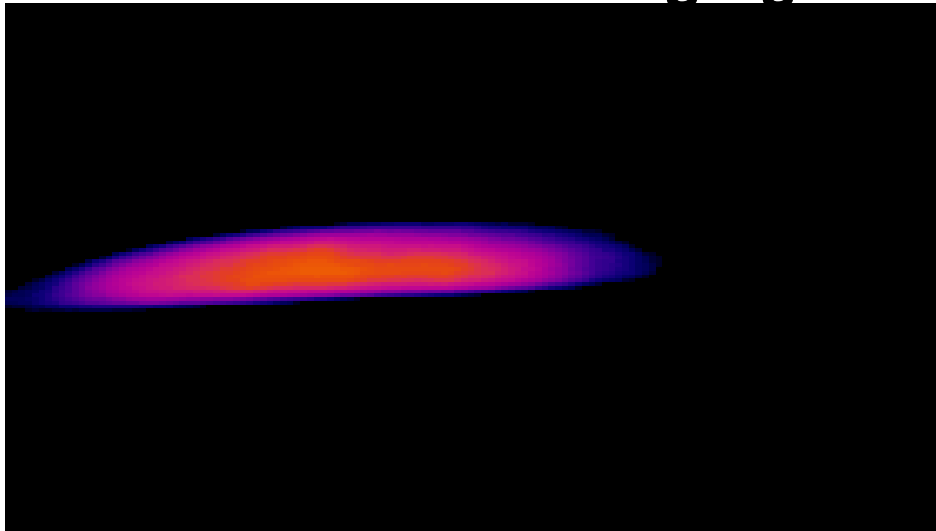
5. SRI

6. Stringham

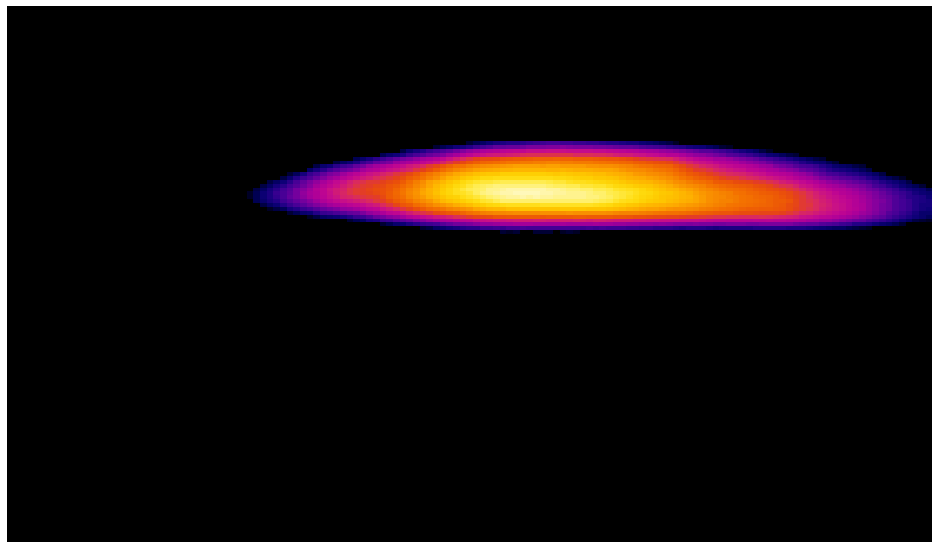
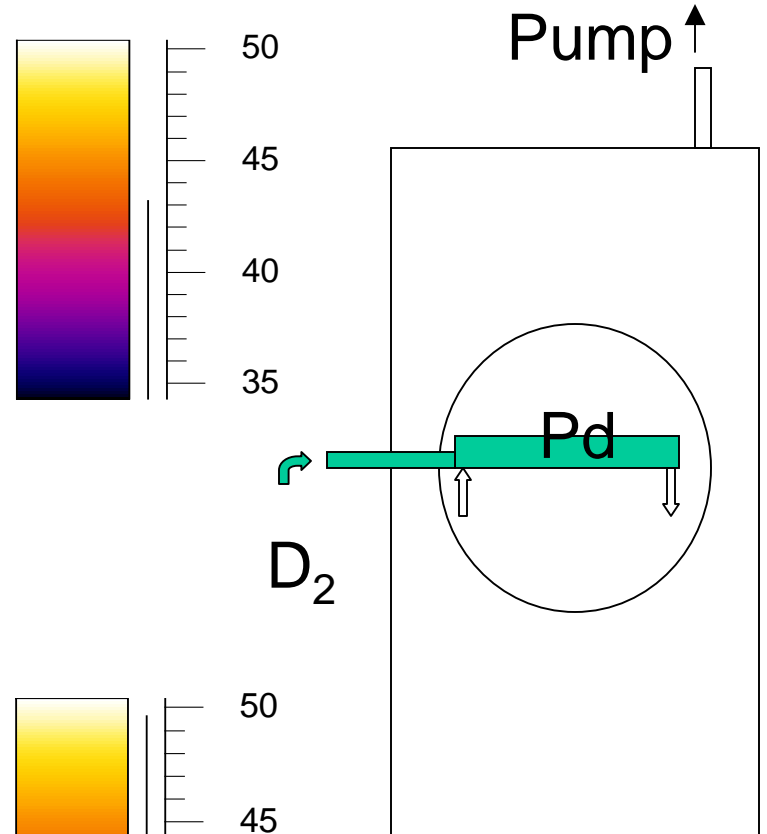
7. Taleyarkhan

8. Schmidt

Infrared Thermal Imaging of Pd Tube



Before Permeation of D_2 Gas through Pd Tube



During Permeation of D_2 Gas through Pd Tube