"МИС-РТ"-2023 Сборник № 84-2 http://ikar.udm.ru/mis-rt.htm

Elevated voltage driven halogen lamp experiments

Presenter:

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Experiments following the methodology proposed by Alexander Parkhomov.

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* Review of tungsten wire electric explosion experiments
* Methodology of halogen lamp experiments
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Tungsten wire electric explosion experiments

* First experiment by Wendt and Irion in 1922: report of yellow spectral line and gas emission

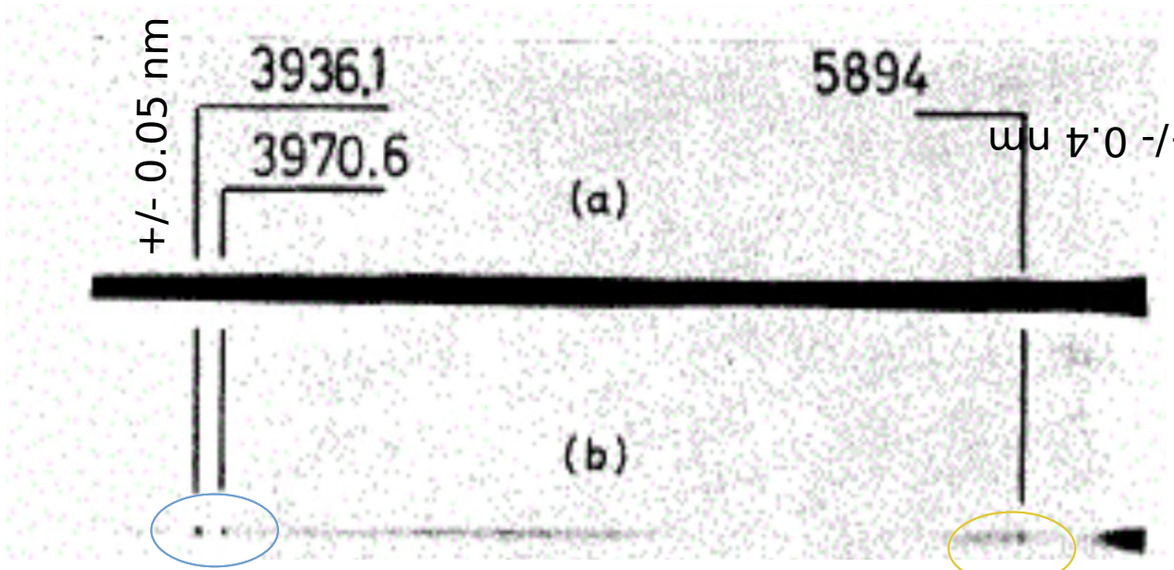
G.L. Wendt and C.E. Irion "Experimental attempts to decompose tungsten at high temperatures", Journal of the American Chemical Society, Volume 44 (1922)

* 1925 experiment: report of excited H_α hydrogen spectral line

H.V.A. Briscoe et al "The electrical explosion of tungsten wires", Journal of the Chemical Society, Volume 127 (1925)

* 1970 experiment: report of excited hydrogen lines and excited sodium double line (yellow line)

B. Stenerhag et al "Some Spectral Characteristics of Exploding Tungsten Wires in Air and Vacuum", Journal of Applied Physics, Volume 41.2 (1970)



Experiment in air

Experiment in vacuum

Tungsten wire electric explosion experiments

* 2012 experiment: report of excited hydrogen lines and excited sodium double line. Also detected some He.

L. Urutskoev et al "Study on the Possibility of Initiating Tungsten Alpha Decay Using Electric Explosion", Journal of Condensed Matter Nuclear Science, Volume 23 (2017)

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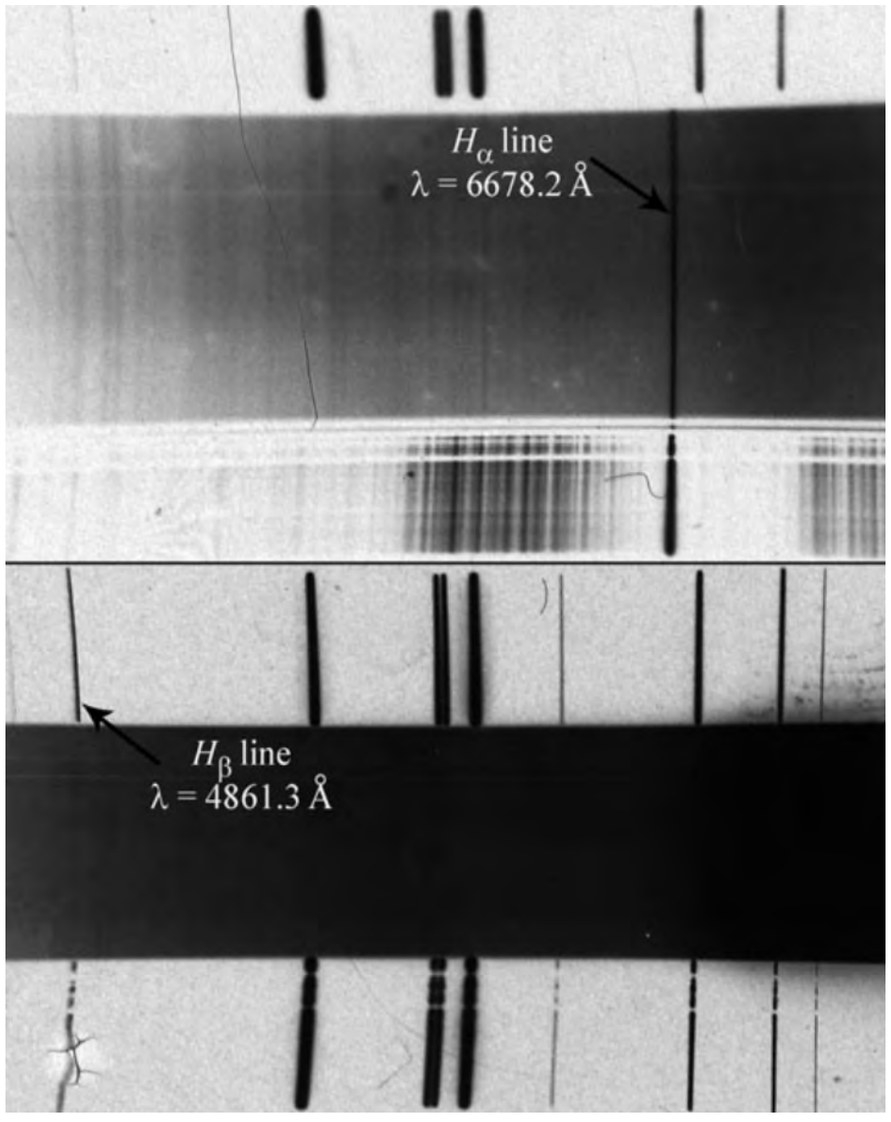
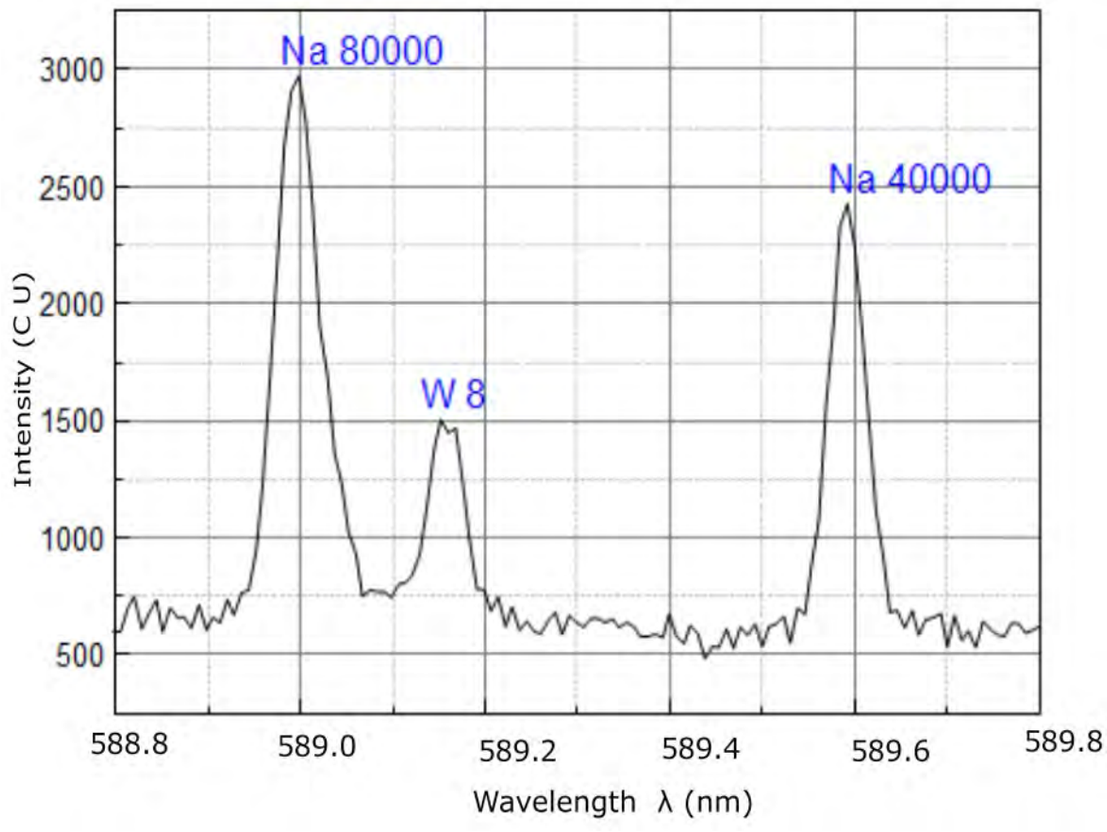
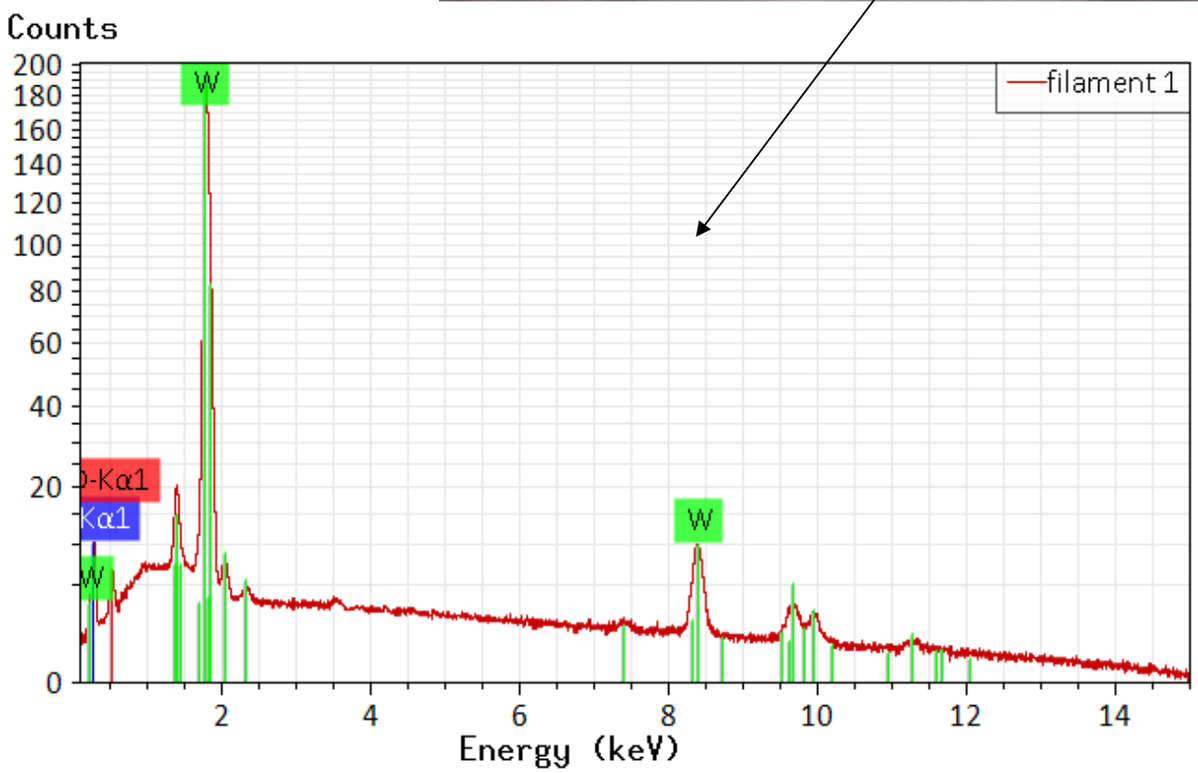


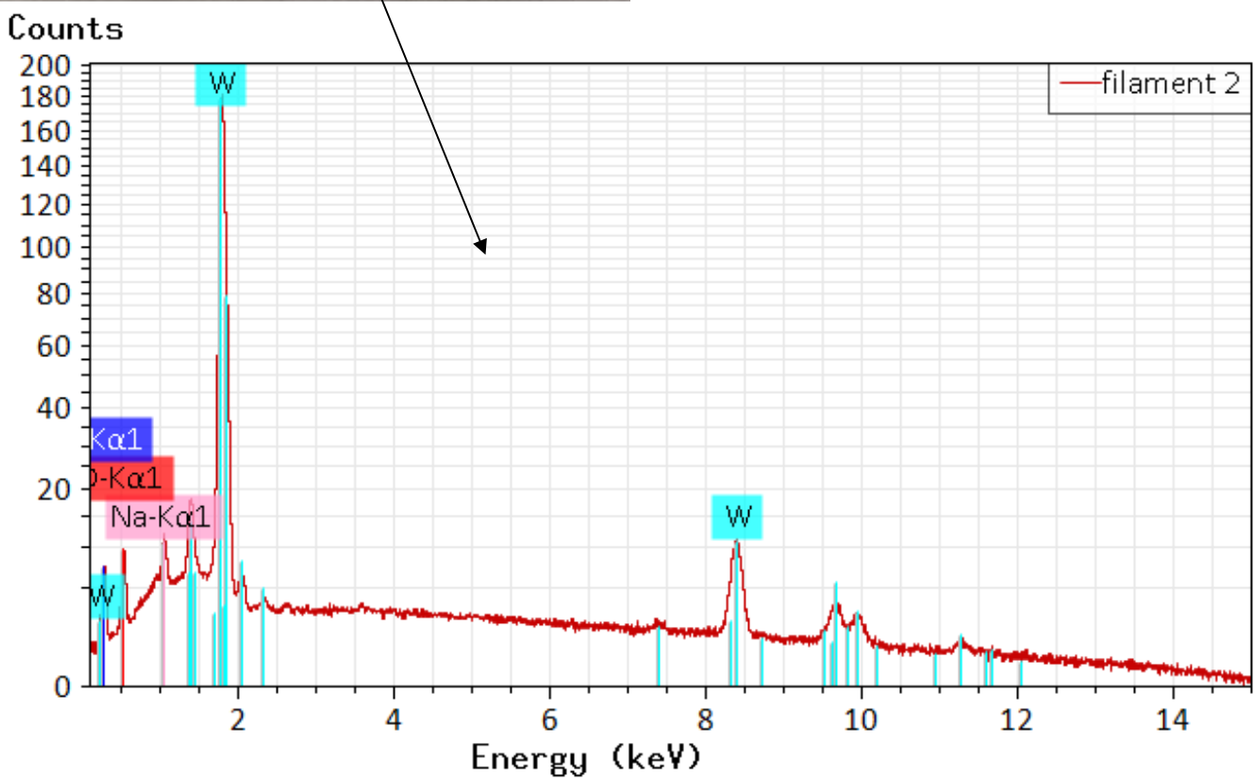


Tungsten wire transmutation in halogen lamp

* First experiment: halogen lamp driven by 280 V AC. Nominal 400 W → actual 600 W. ON-OFF switching program: lamp is ON for 6 s, and then OFF for 20 s.

* The filament breaks up after some hours. Its surface composition:





Tungsten wire transmutation in halogen lamp

* Na is the only appearing new element. Emission of H is possible, but not detected.

* **Are we observing the same reaction in the halogen lamp as in the electrically exploded tungsten wire?**

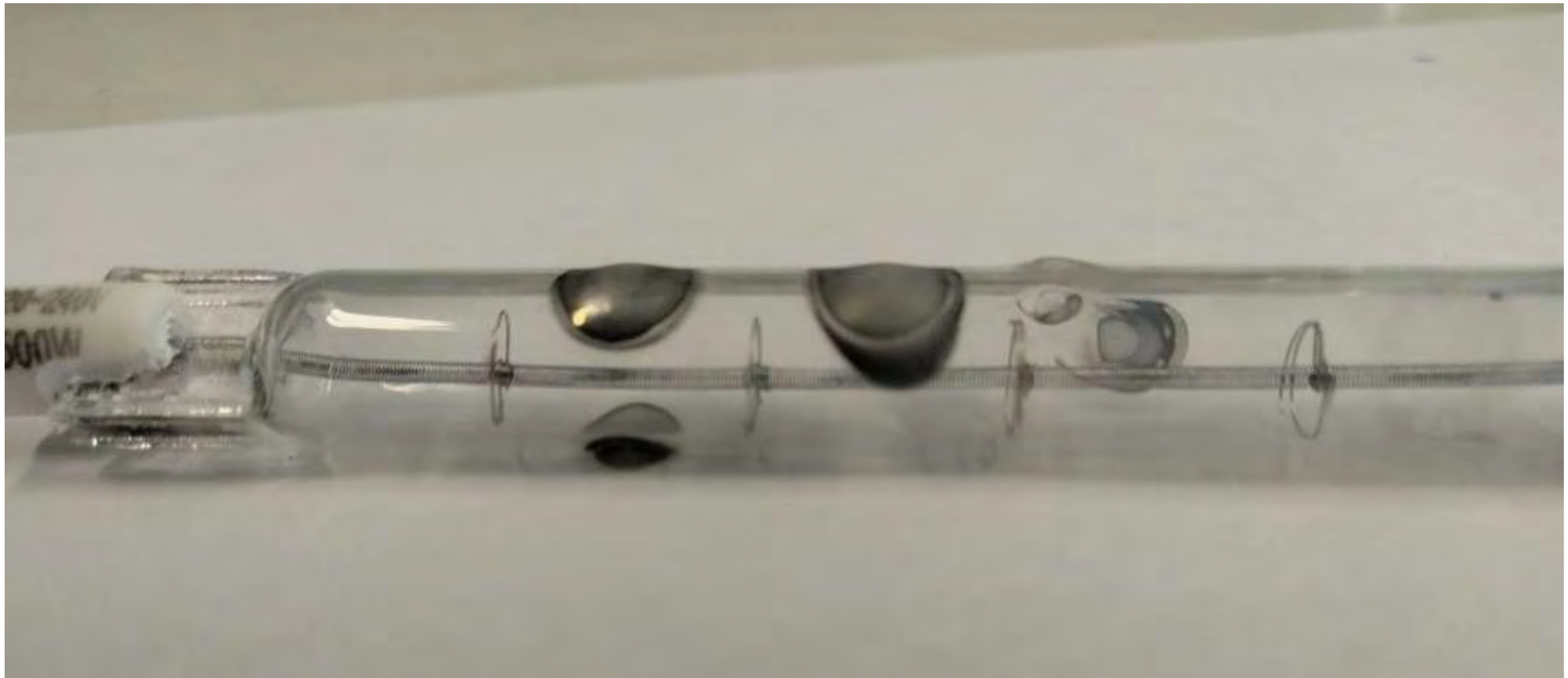
* Before break-up, the wire becomes thinner at the break-up location. Current density is maximized here. Nuclear transmutation is concentrated in this spot.

* What happens to the rest of tungsten nucleus, if we are observing the transmutation of tungsten: why did we not detect heavy other elements below tungsten??

Tungsten wire hot spots

* In an other experiment, the lamp was operated at 300 V with ON-OFF switching program: lamp is ON for 6 s, and then OFF for 200 s.

* The appearing metallic discs comprise evaporated tungsten, they are on the inner quartz surface.
The hot-spots are at the center of evaporation discs

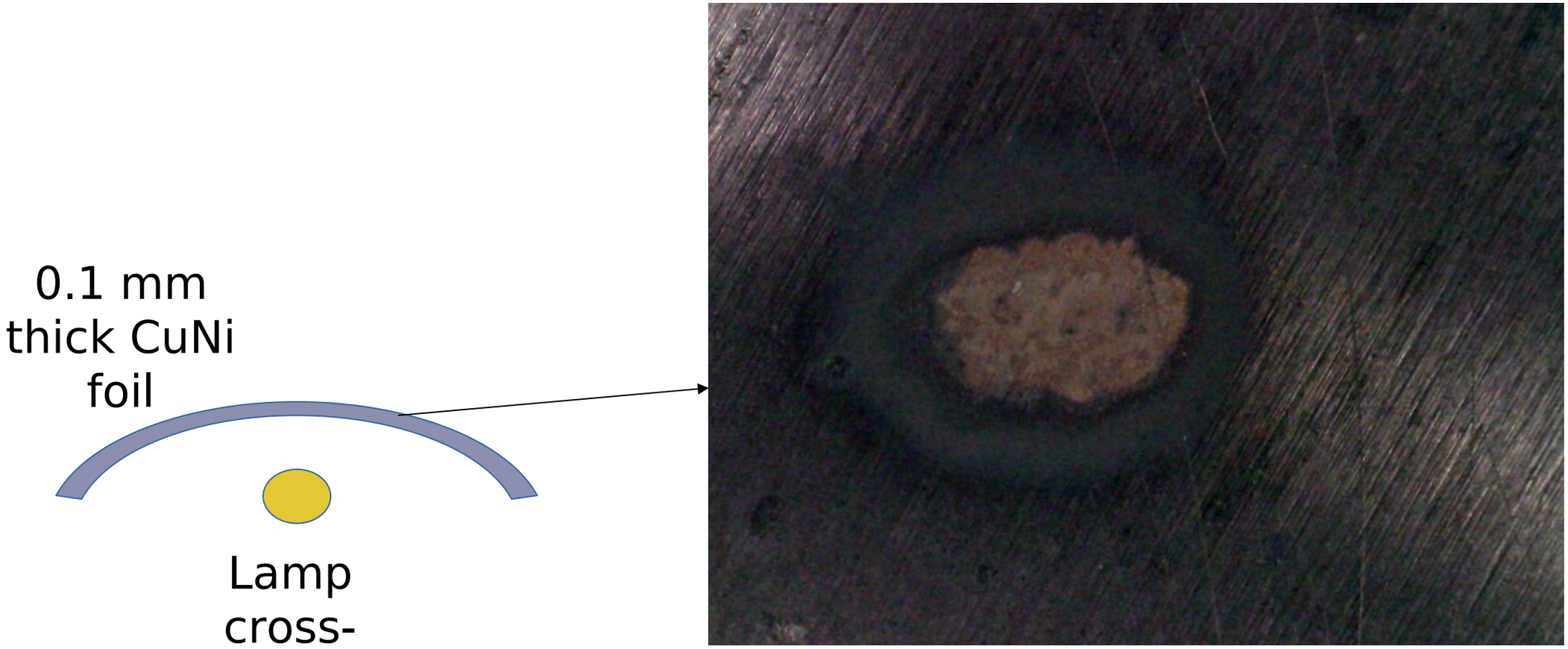


CuNi transmutation near halogen lamp

* We placed a 0.1 mm thick constantan (CuNi) foil close to the lamp (1-2 cm distance)

* The lamp was operated at 280 V voltage for approximately 15 minutes. The surface of the constantan foil became oxidized around the lamp.

* The photo shows the magnification of a tiny spot that appeared on the outer foil surface.



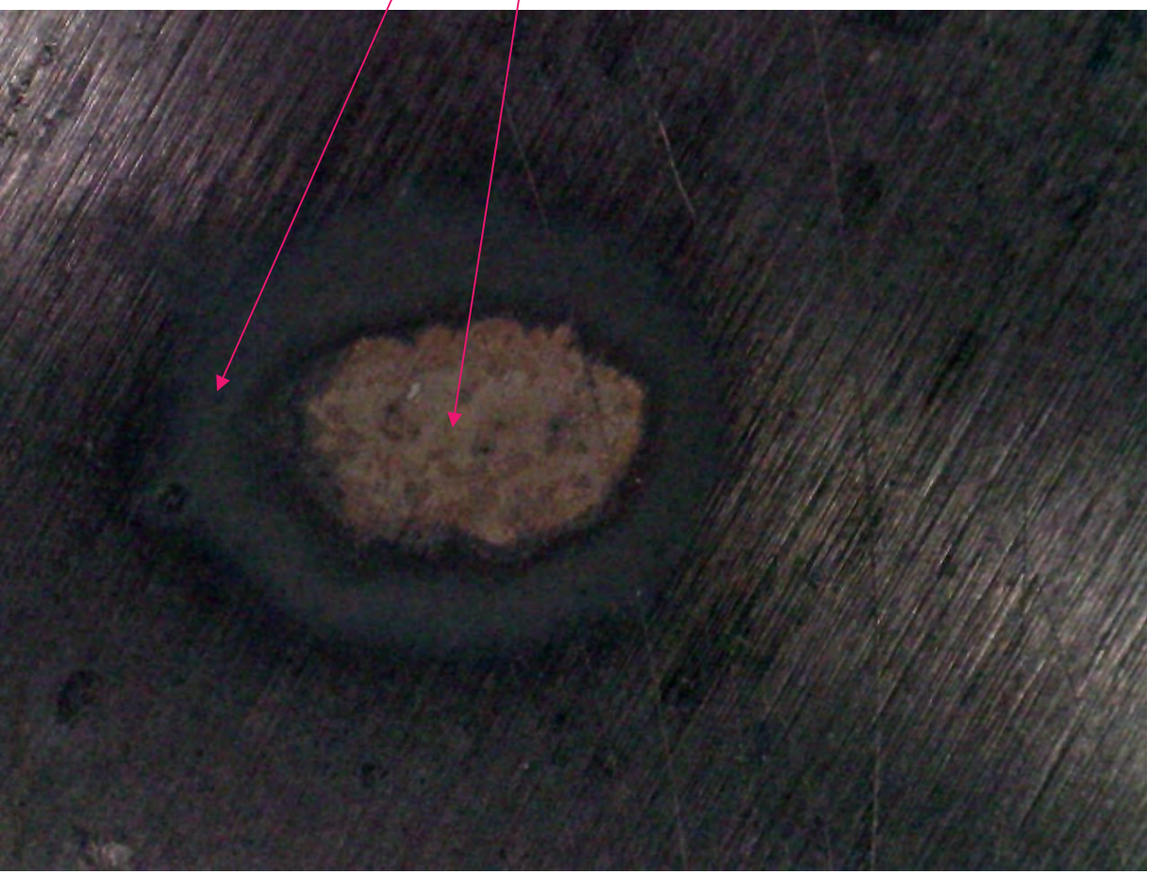
CuNi transmutation near halogen lamp

* The elemental composition of constantan is mainly Cu and Ni, with <1% Mn.

* The newly appearing elements in the spot are Mg, Al, S, Si, K, Ca. Sulfur is the main new element.

* Are we looking at the fission of Cu or Ni? (all newly appearing elements are lighter) Or are we looking at O+O fusion? This can be studied by testing various foil materials.

	Cu	Ni	Mn	Fe	**S**	K	Si	Ca	Mg	Al
Around the spot	82.5%	16.15%	0.9%	0.15%	**0%**	0%	0.08%	0.03%	0%	0.02%
Center of the spot	65.5%	25.8%	0.63%	0.73%	**3%**	2%	0.88%	0.88%	0.5%	0.5%

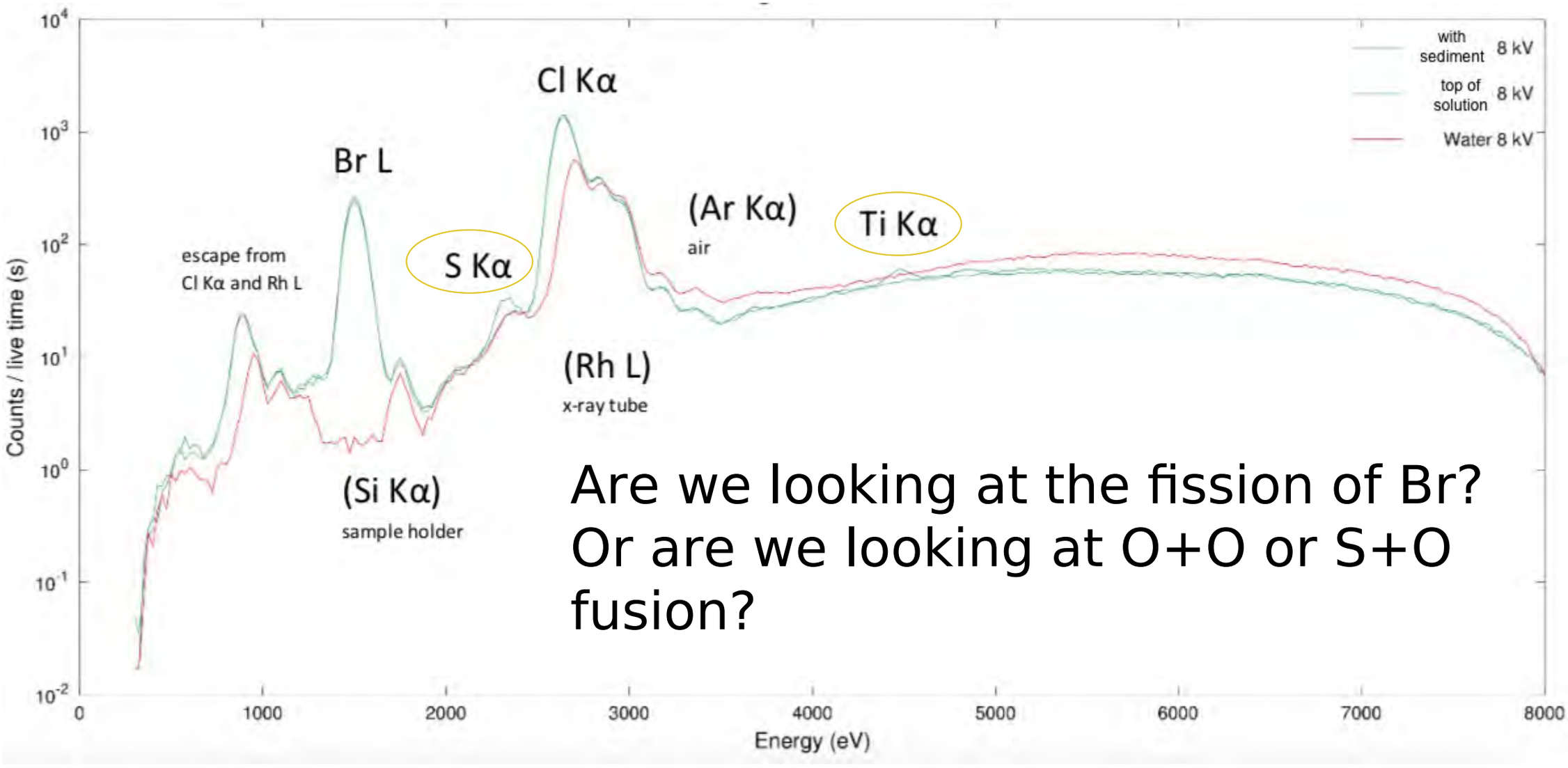


The weight percentage composition of the spot ares (excluding oxygen)

Halogen lamp immersed in LiBr/LiCl solution

* We immersed a lamp into aqueous LiBr/LiCl solution: it was operated at 300 V voltage for approximately 30 minutes.

* A post-experiment sample was a clear liquid. After some time, a sediment appeared in it. It probably comprises materials that were freshly made during the experiment. The XRF analysis of this sediment shows the appearance of S and Ti in approximately equal concentrations, and no other new elements.



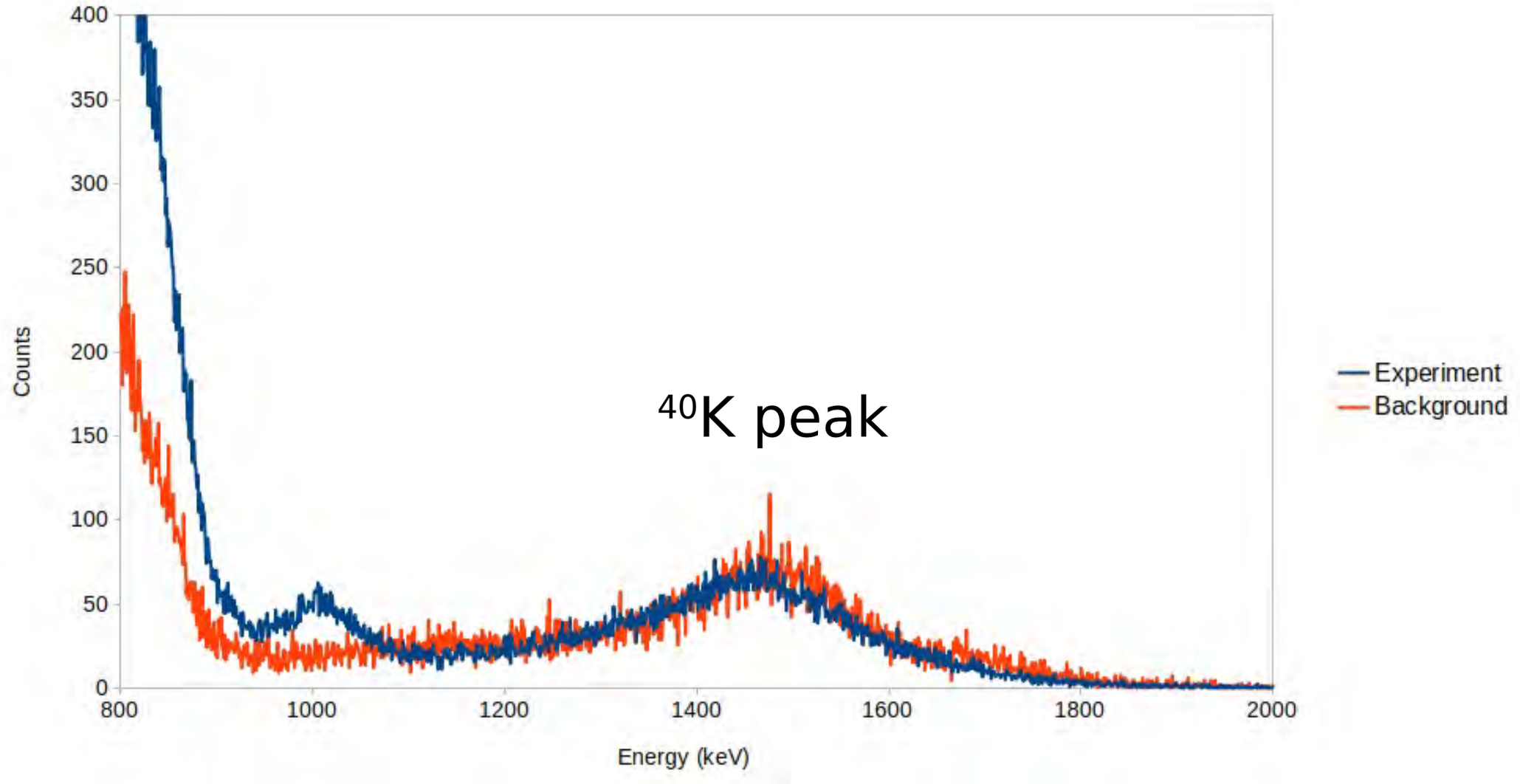
Are we looking at the fission of Br? Or are we looking at O+O or S+O fusion?

Halogen lamp immersed in $Li_2B_4O_7$ powder

* We immersed a lamp into $Li_2B_4O_7$ powder: it was operated at 300 V using 6 s ON and 200 s OFF program.

* The gamma spectrum was measured over 30 hours, using NaI detector and shielding that reduced background by 50%.

* A new peak appears at 1 MeV. The excess radiation below this peak may correspond to braking radiation, where the particle's kinetic energy extends up to 1 MeV.



Halogen lamp excess heat measurement

* The effect of continuous versus ON-OFF AC voltage was evaluated by A. Parkhomov.

* A nominal 500 W halogen lamp is placed into an alumina tube, filled with MgO powder.

* The input voltage was adjusted to reach an external reactor temperature of 164 Celsius. With continuous AC voltage, 45.2 W input is required. With 10 s ON / 90 s OFF program, only 38.4 W average input is required (384 W when lamp is turned on).

* COP evaluation: (38,4+6,8)/38,4 = 1,18.

* 18% excess heat appears from the start of AC voltage ON-OFF program.

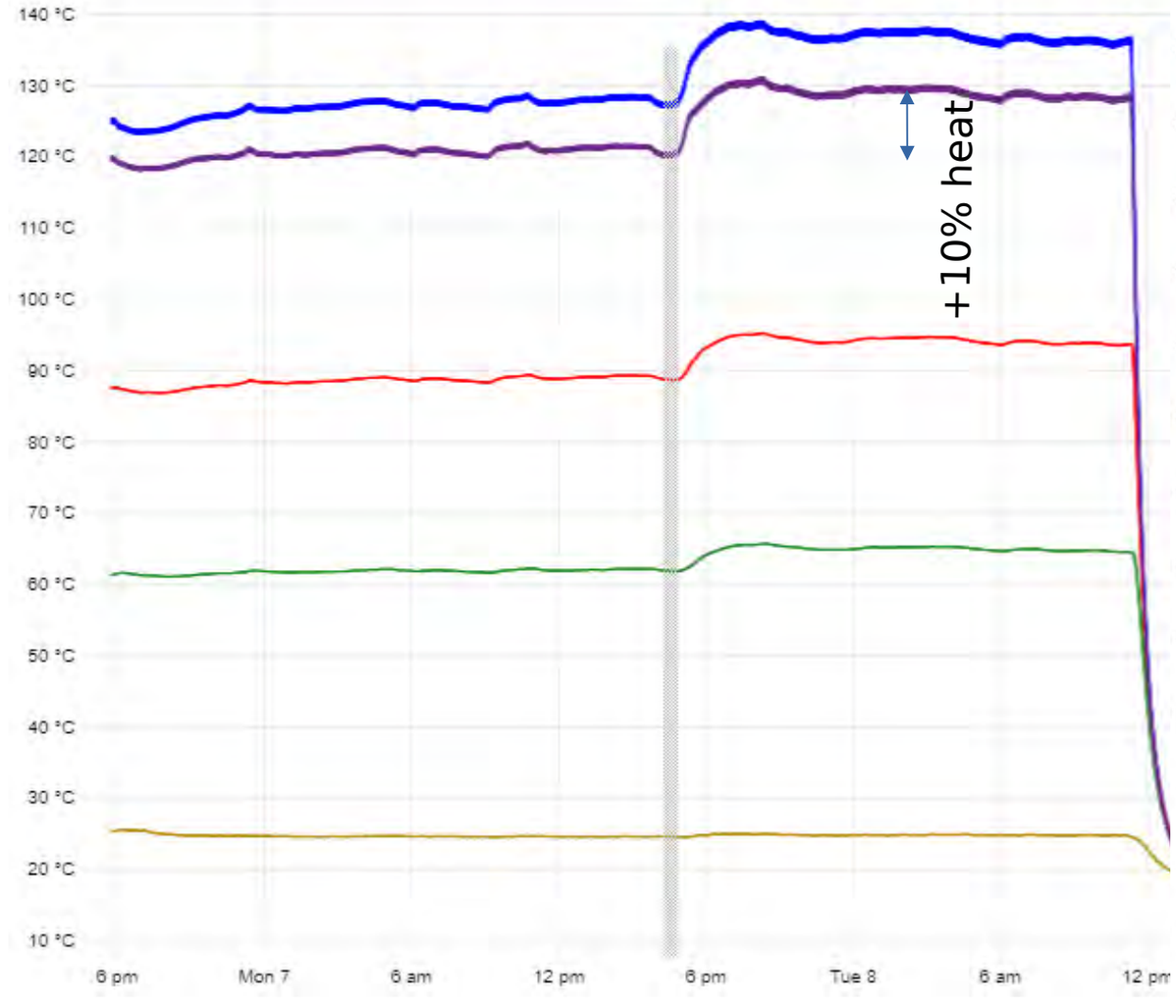
Excess heat with $Li_2B_4O_7$ powder

* We immersed a lamp into $Li_2B_4O_7$ powder: it was operated at 280 V / 300 V using 6 s ON and 200 s OFF program.

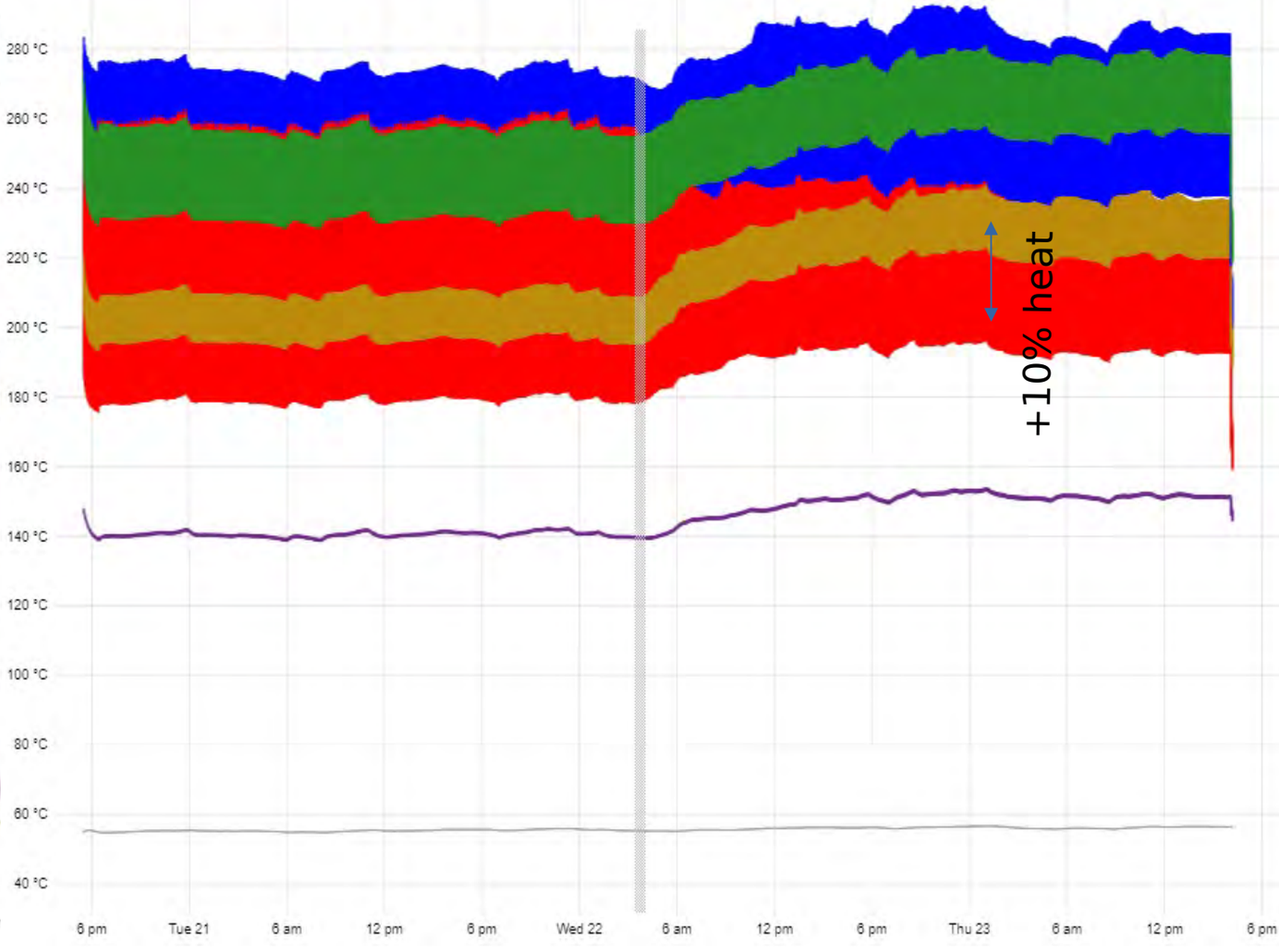
* The changes in heat output were evaluated by thermocouples.

* The vertical line shows the appearance of more excess heat.

300 V AC experiment



280 V AC experiment



Excess heat with $Li_2B_4O_7$ or MgO powder

* With $Li_2B_4O_7$ powder, +10% excess heat appears 20-30 hours after the start of experiment. This % seems independent of the AC voltage value.

* Altogether, the final COP is 1.18*1.1=1.3. I.e. we achieved 30% stable excess heat (till filament break-up).

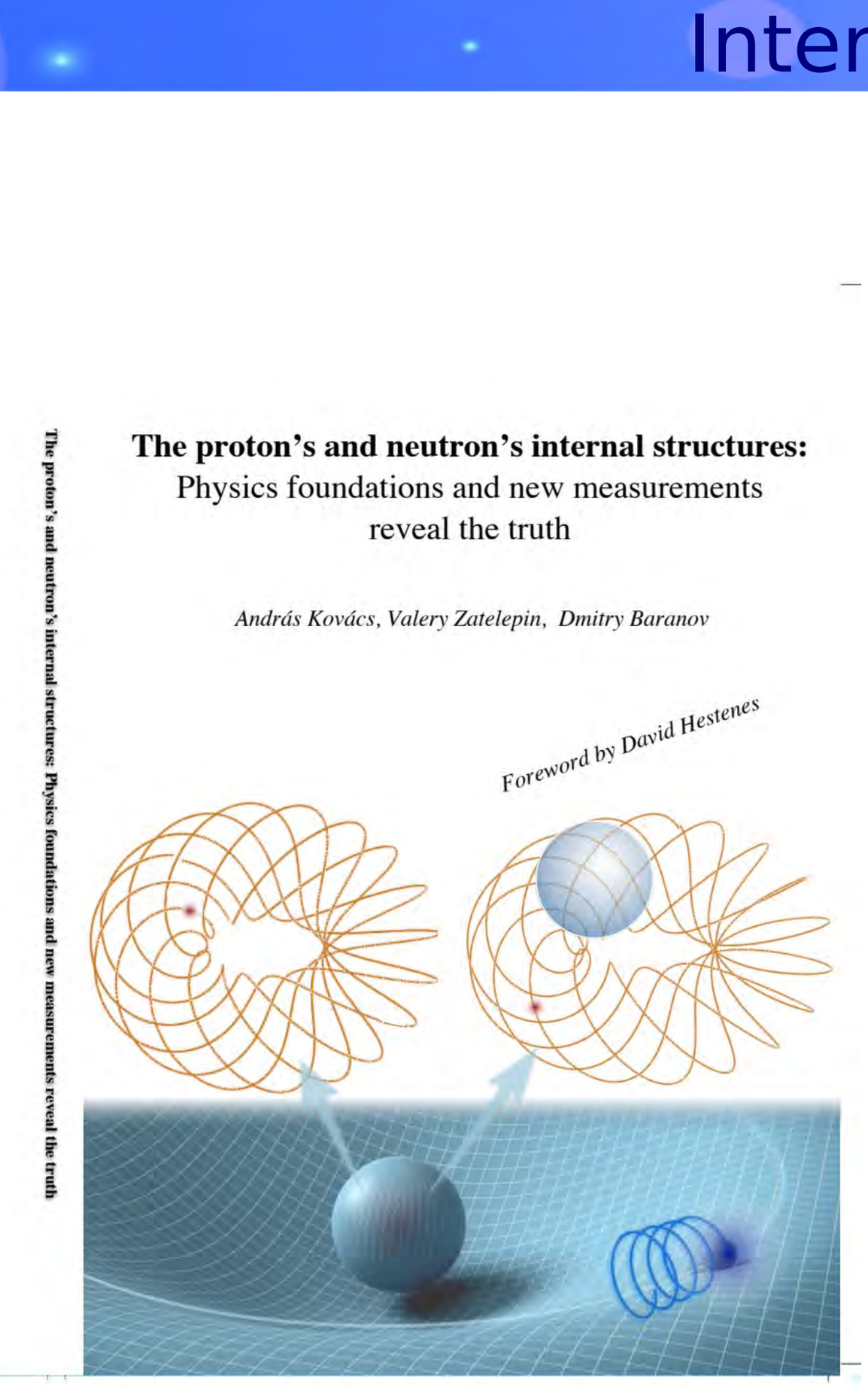
* With MgO powder, we get qualitatively same result: +7% excess heat appears 20-30 hours after the start of experiment.

Melting of $Li_2B_4O_7$ powder

* After the experiment, $Li_2B_4O_7$ powder was melted onto the lamp surface.

* $Li_2B_4O_7$ melting point: 917 Celsius. Lamp surface: up to 300 Celsius, as measured by a thermocouple placed at the lamp surface. How did this melting happen?

Interpretation



* A soon to be published book will discuss some aspects of these halogen lamp experiments.

* The correct understanding of atomic/molecular structures is required to make sense of chemical reactions.

* Similarly, the correct understanding of proton and neutron structures is eventually required to make sense of nuclear reactions.

Conclusions

* The presented experimental methodology gives replicable results, and it is a cost-effective platform for LENR investigation.

* The observed reactions are probably the same as in the case of electrically exploded metal wires.

* The existence of stable excess heat production has been demonstrated; i.e. it is principally possible to use this reaction for energy production.

* The obtained 30% excess heat is not practical in itself, the reaction is terminated by the eventual filament break-up.

Thank you for your attention!