

DS cleaning Protocol vs CUORE cleaning Protocol

DS

1. Tumbling

2. EP 100 μm

3. SUBU (Etching)

CUORE

1. Tumbling

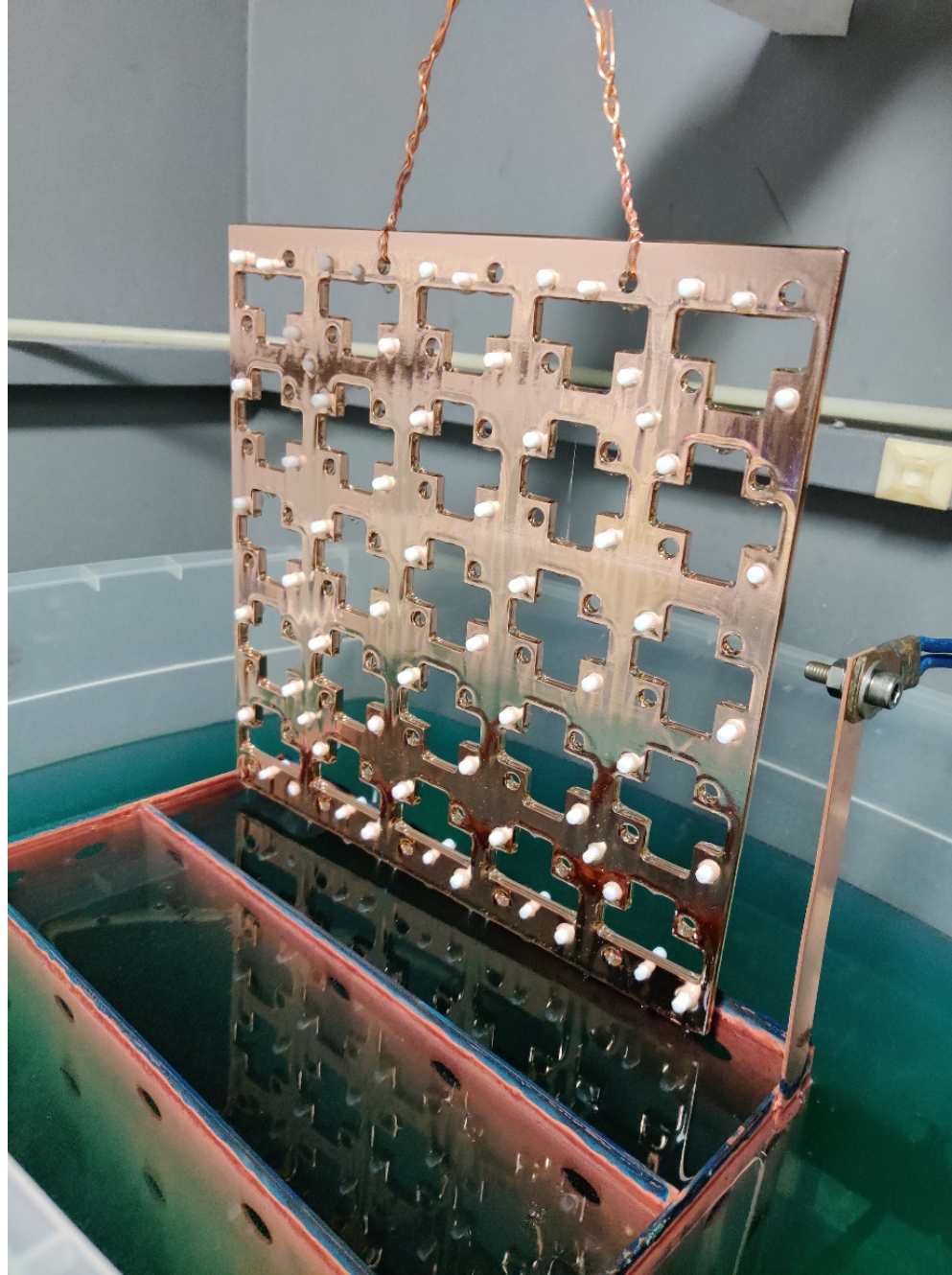
2. EP 100 μm

3. SUBU (Etching)

4. Vacuum Plasma Cleaning

Wrong Passage
(no potential during
sample extraction)

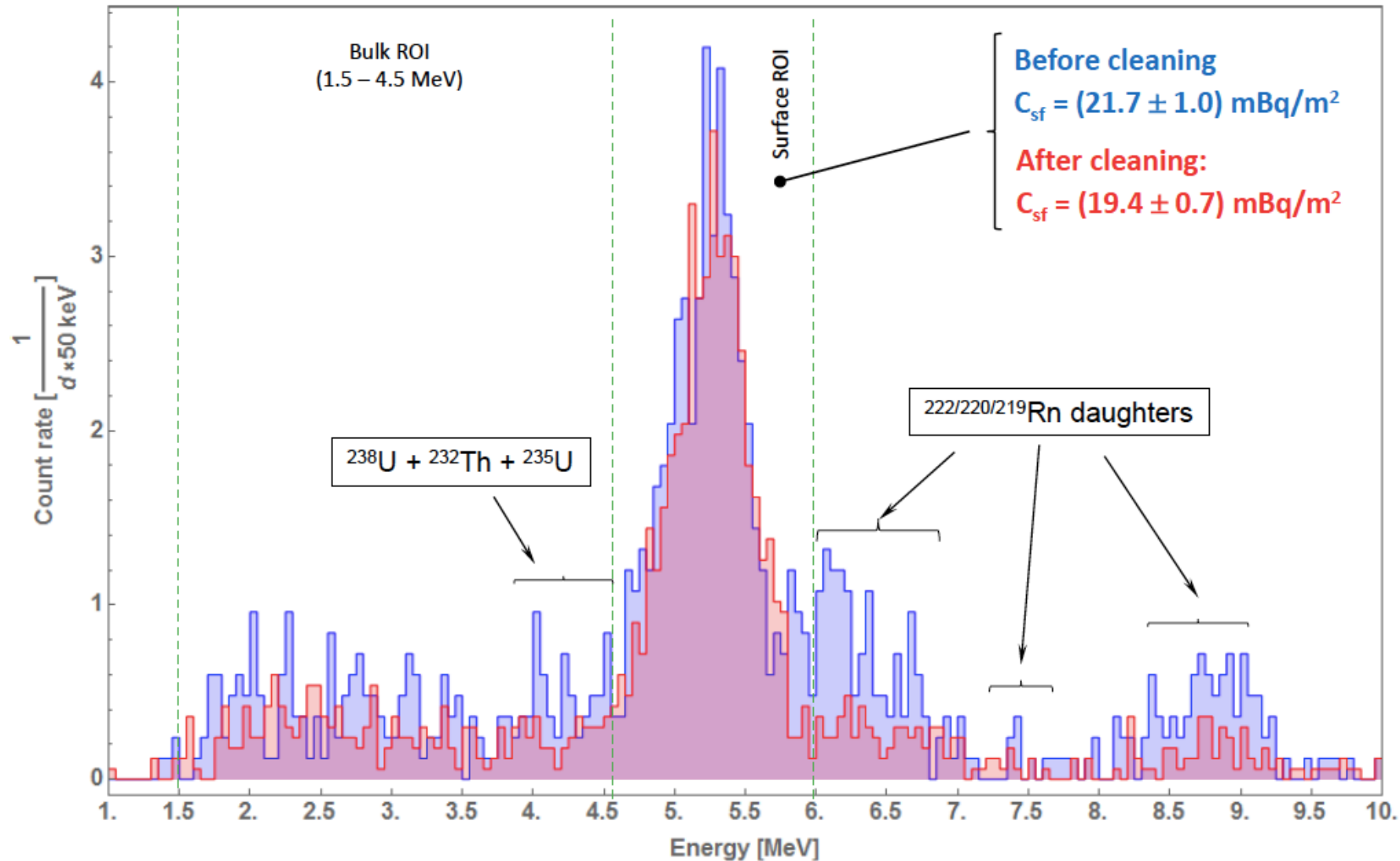
Extraction of a DS Motherboard During EP Process



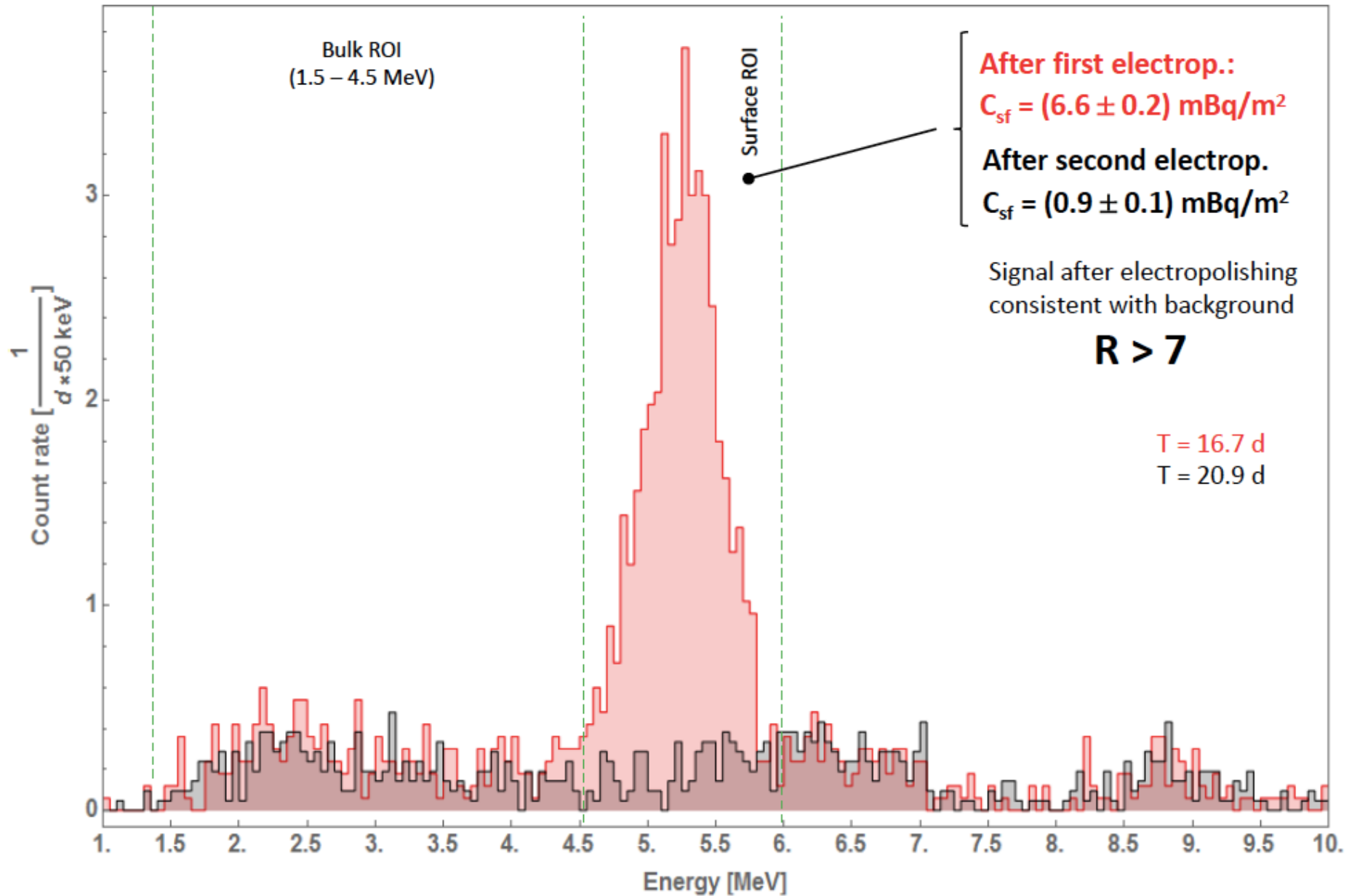
210Po after Copper Cleaning Protocol (Wrong Passage)

DS Copper Cleaning Protocol:

1. 4 Copper plates (100x100mm) are measured showing ^{210}Po residual contaminants



1° test: EP only on the same samples



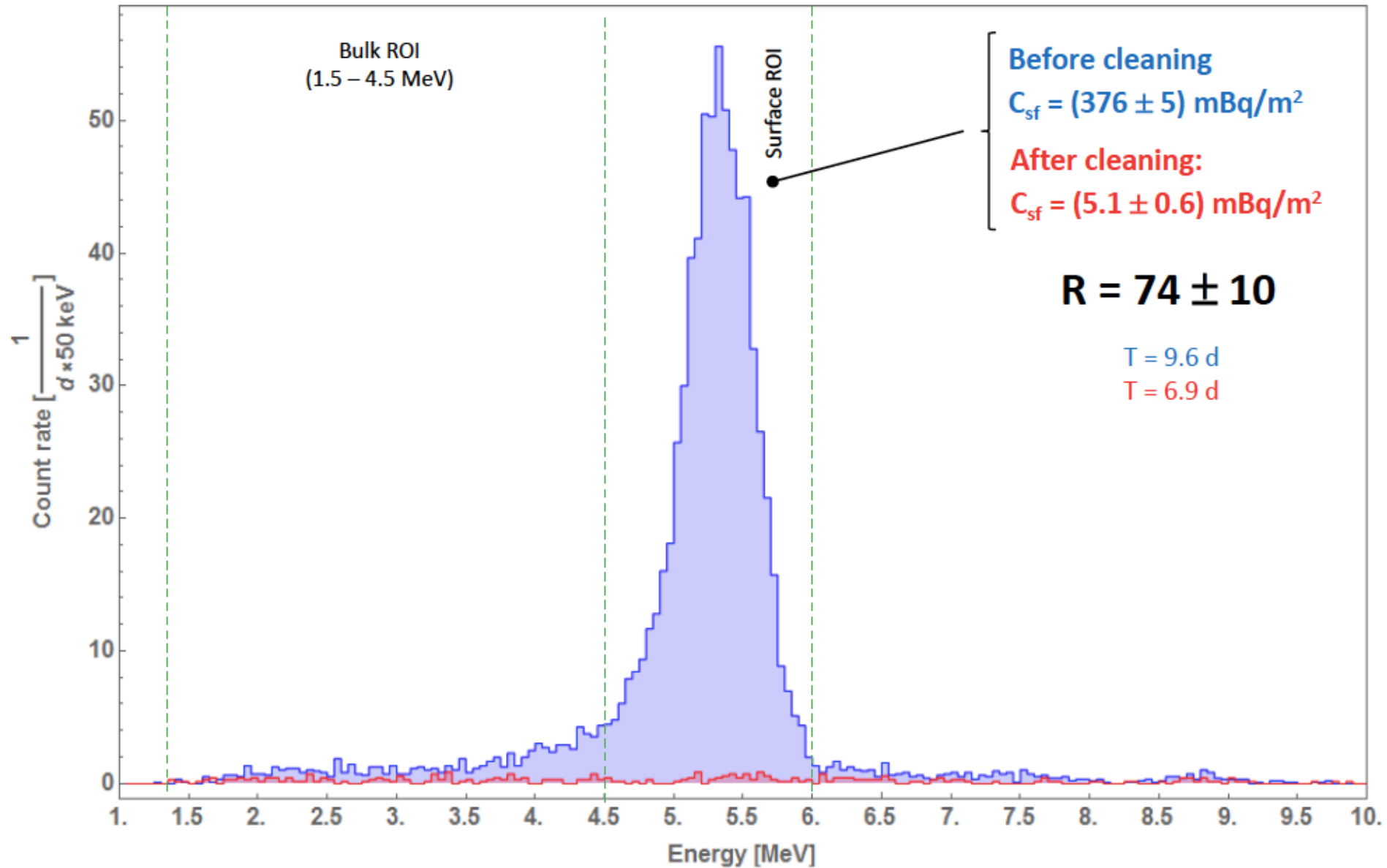
1° Test Conclusions

1. The Electropolishing Process **executed in the right way** on the same plates reduces 7 times the level of ^{210}Po



**Maintaining the EP potential during
the samples extraction from the
chemical bath**

2° test: Complete Protocol on a copper plate with Higher amount of ^{210}Po



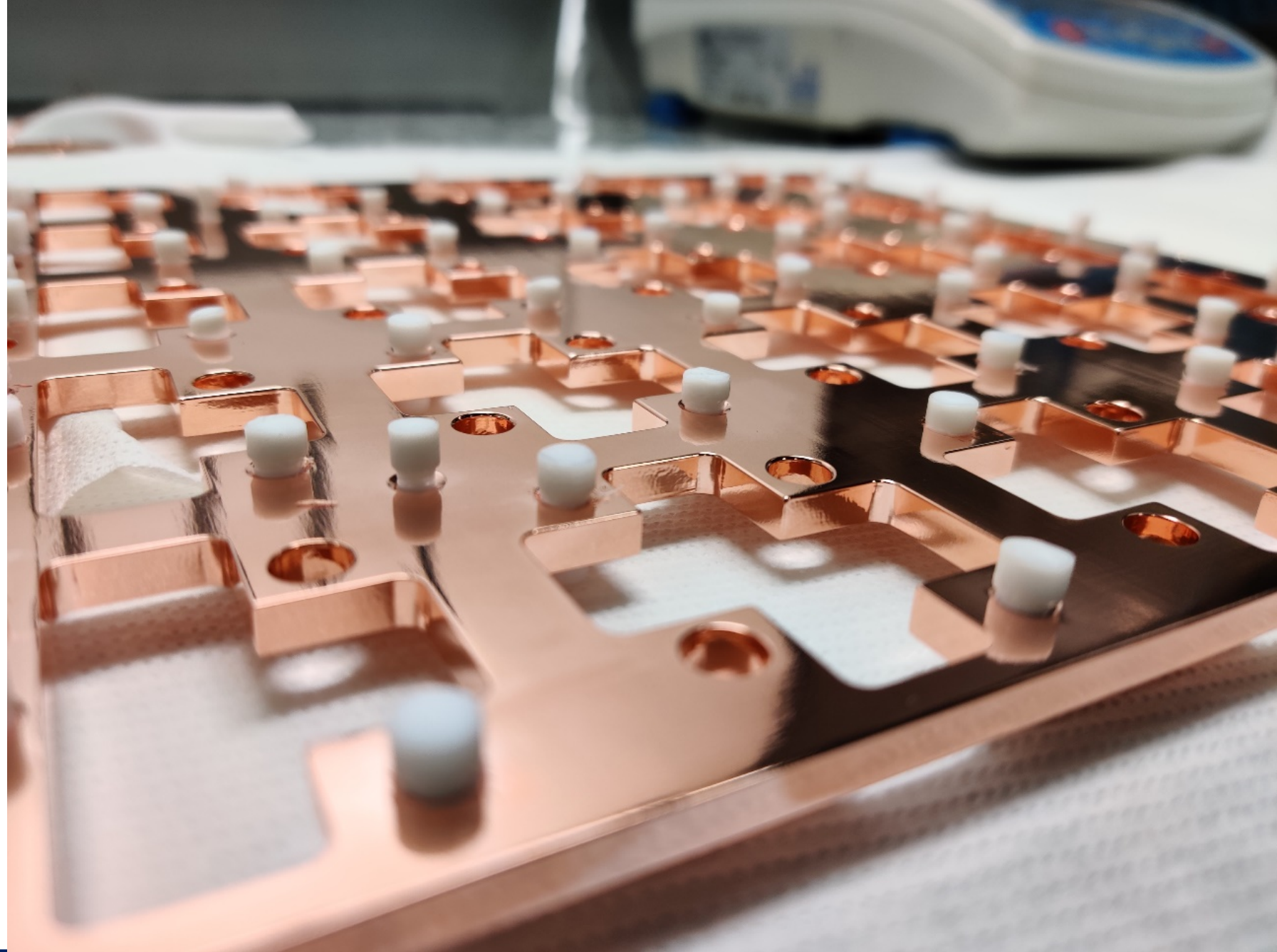
2° Test Conclusions

1. The combination of the Processes established in the protocol **reduces 74 times** the level of ^{210}Po
2. The transport (in triple bags under vacuum) and the manipulation (nitrile gloves) defined in the **protocol avoid the copper recontamination**

Dimensional check in Bologna (Paoloni-Garbini)

1. After the treatments (Copper Protocol) the tolerances on the MB are no more respected
2. The Cleaning production was immediately stopped
3. We are waiting for the technical drawings to understand how to proceed:
 - a) Reducing the total thickness removed (**to be validated from Krakow**)
 - b) Fixing Teflon protections (**during the EP of actual protocol**) on the critical parts in order to maintain the tolerances

Motherbord After EP + Teflon protection



Surface Treatments Updates Stainless Steel Cleaning Protocol

DS SS Cleaning Protocol:

1. 4 SS (304) plates (100x100mm) are at LNL ready to be cleaned (on the way)
2. Considering the dimensions (6m) we propose to treat with EP and CE
 - Tumbling in not feasible

Standard SS EP baths:

1. Based on Phosphoric + Sulfuric acid + additives (like glycerol)
2. Based on Sulfuric acid + CrO_3 (chromium anhydride)
3. Based on HClO_4 + Acetic anhydride $(\text{CH}_3\text{CO})_2$

Surface Treatments Updates Conformal Coating for Electronic shielding

DS Conformal Coating:

1. Alessandro had good results at LNGS with varnish conformal coating
2. There is the possibility to test 10 FEB in January 2021 with a Parylene conformal coating
(check with Saverio and Alessandro)