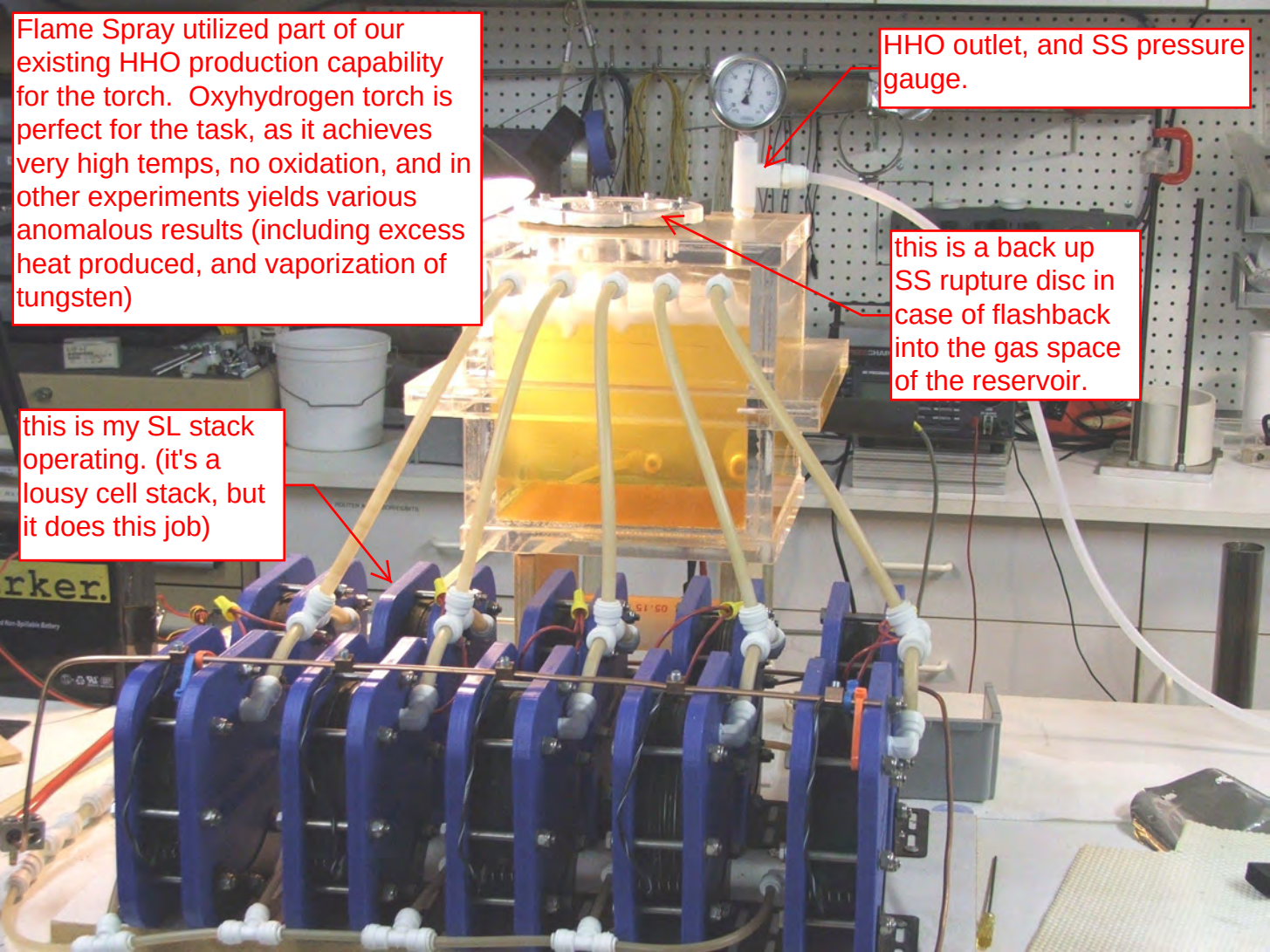
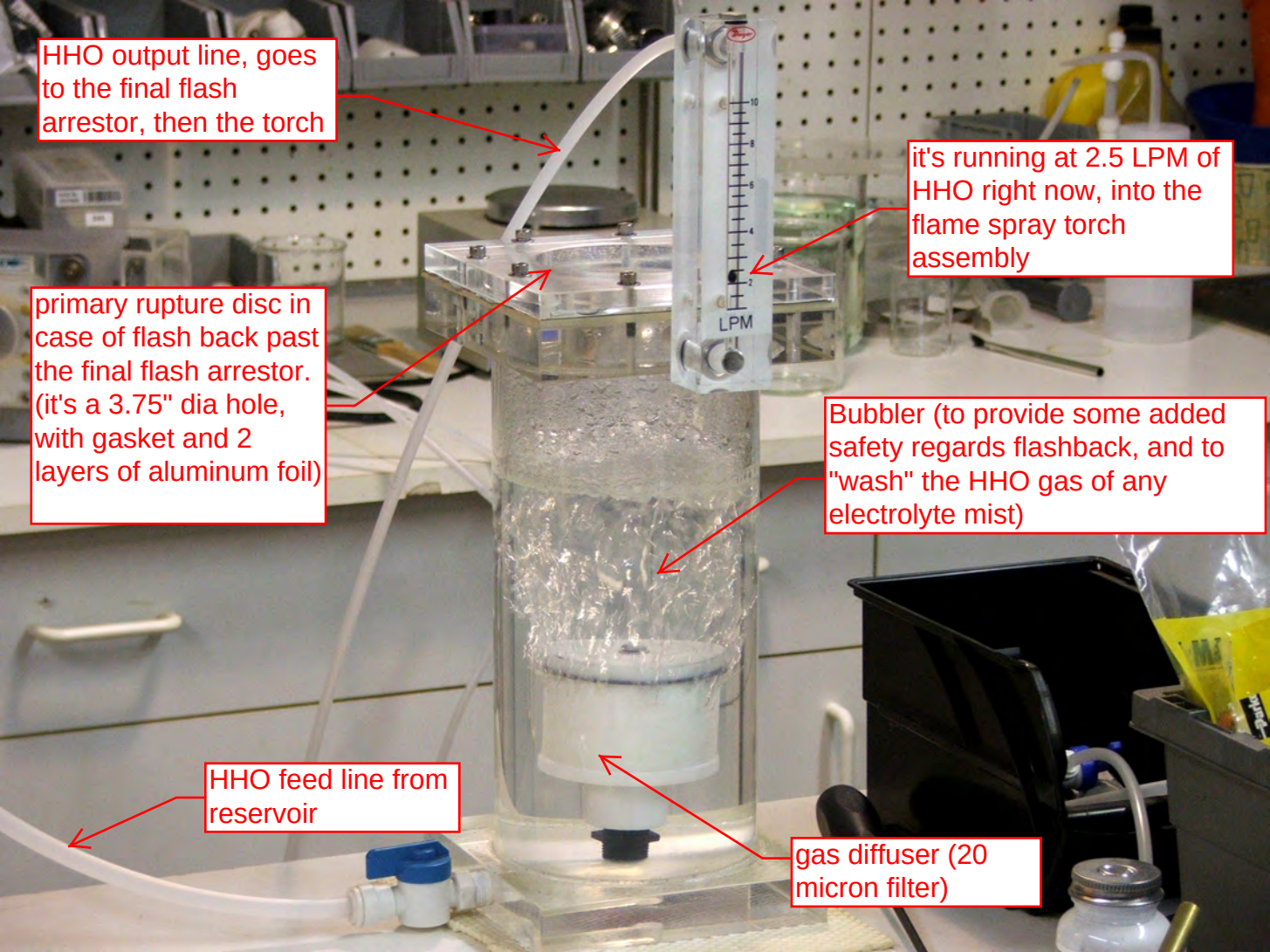
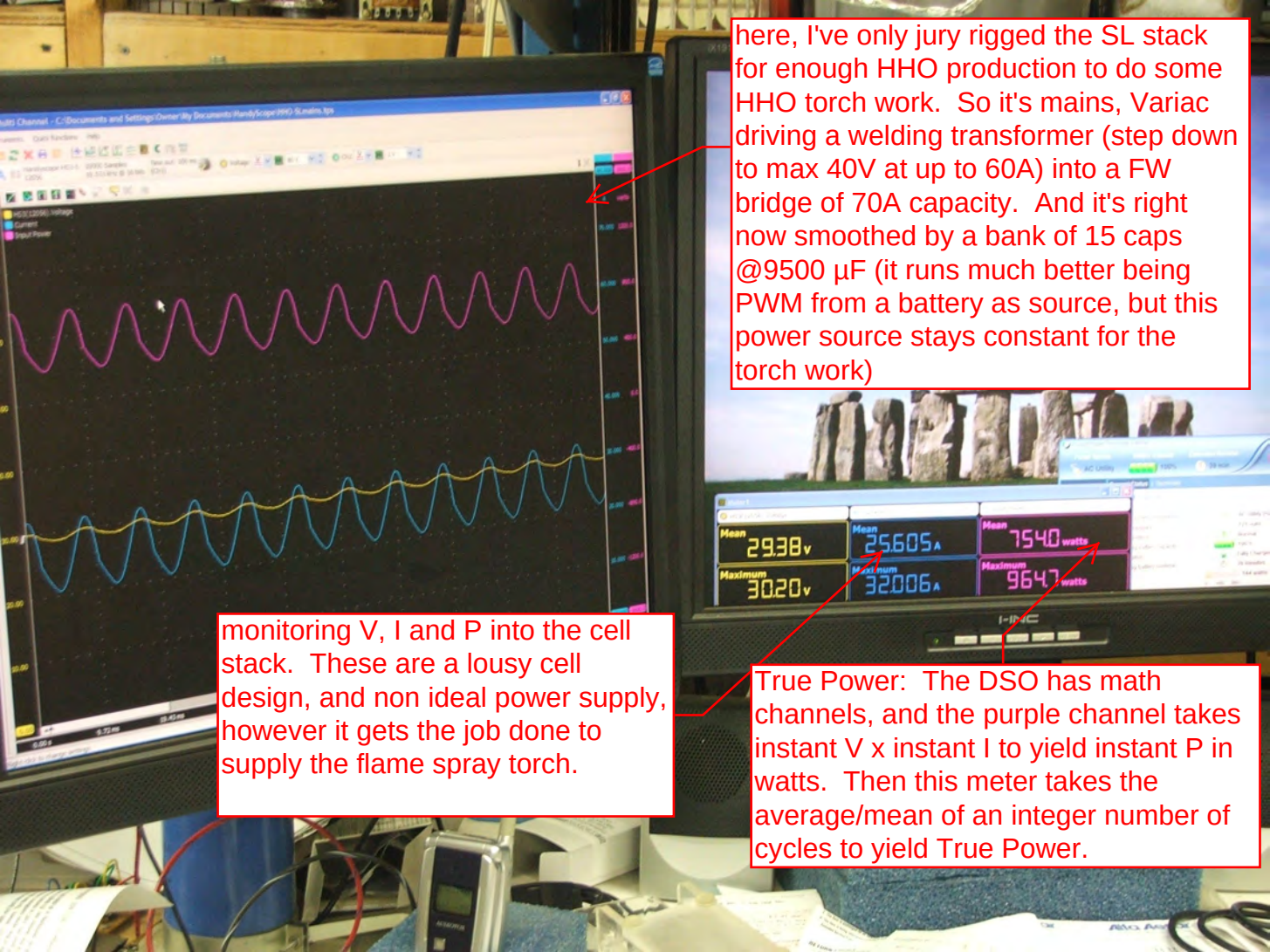

Flame Spray utilized part of our existing HHO production capability for the torch. Oxyhydrogen torch is perfect for the task, as it achieves very high temps, no oxidation, and in other experiments yields various anomalous results (including excess heat produced, and vaporization of tungsten)
HHO outlet, and SS pressure gauge.
this is a back up SS rupture disc in case of flashback into the gas space of the reservoir.
this is my SL stack operating. (it's a lousy cell stack, but it does this job)

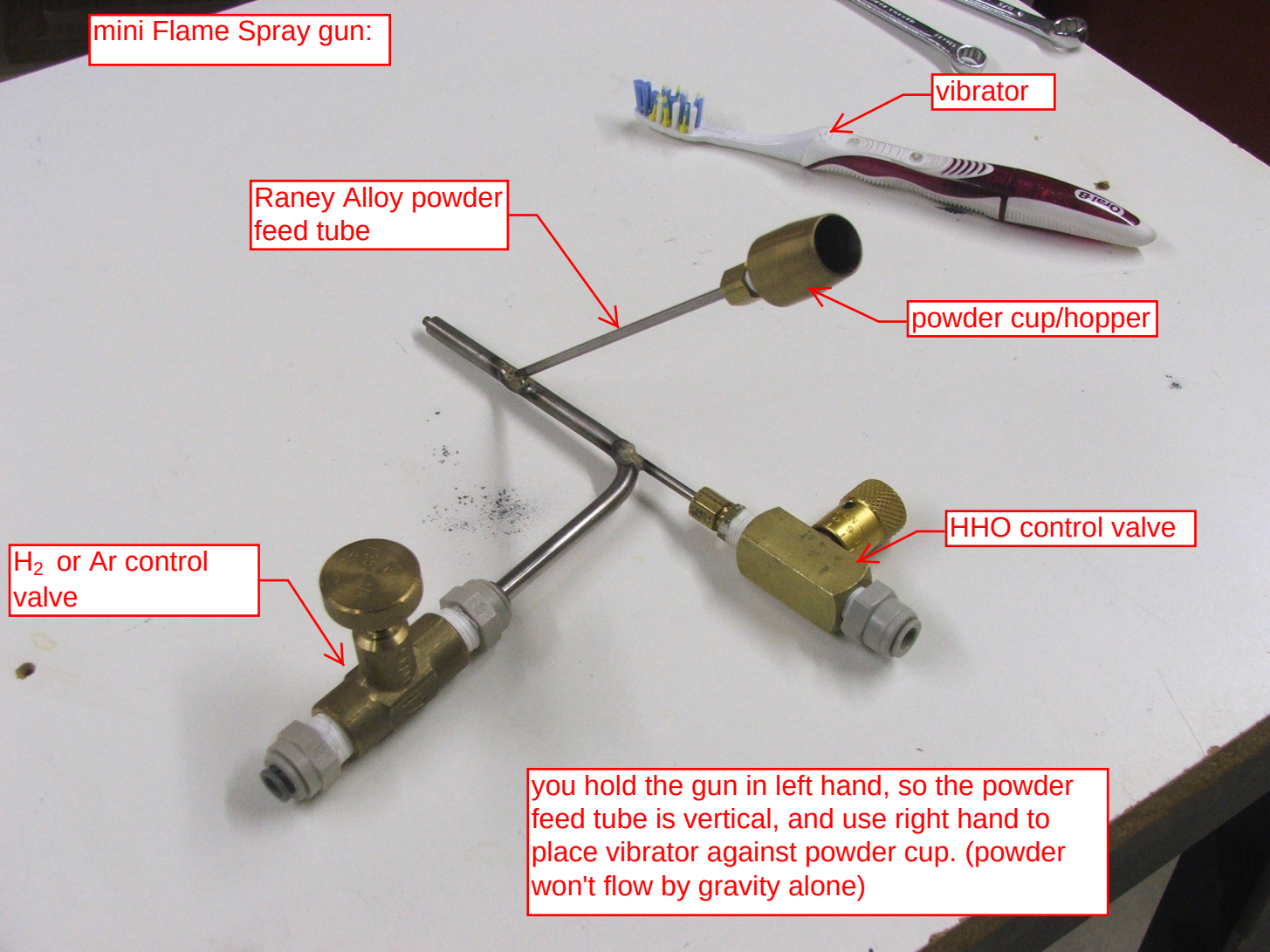

HHO output line, goes to the final flash arrestor, then the torch
it's running at 2.5 LPM of HHO right now, into the flame spray torch assembly
primary rupture disc in case of flash back past the final flash arrestor. (it's a 3.75" dia hole, with gasket and 2 layers of aluminum foil)
Bubbler (to provide some added safety regards flashback, and to "wash" the HHO gas of any electrolyte mist)
HHO feed line from reservoir
gas diffuser (20 micron filter)
LPM

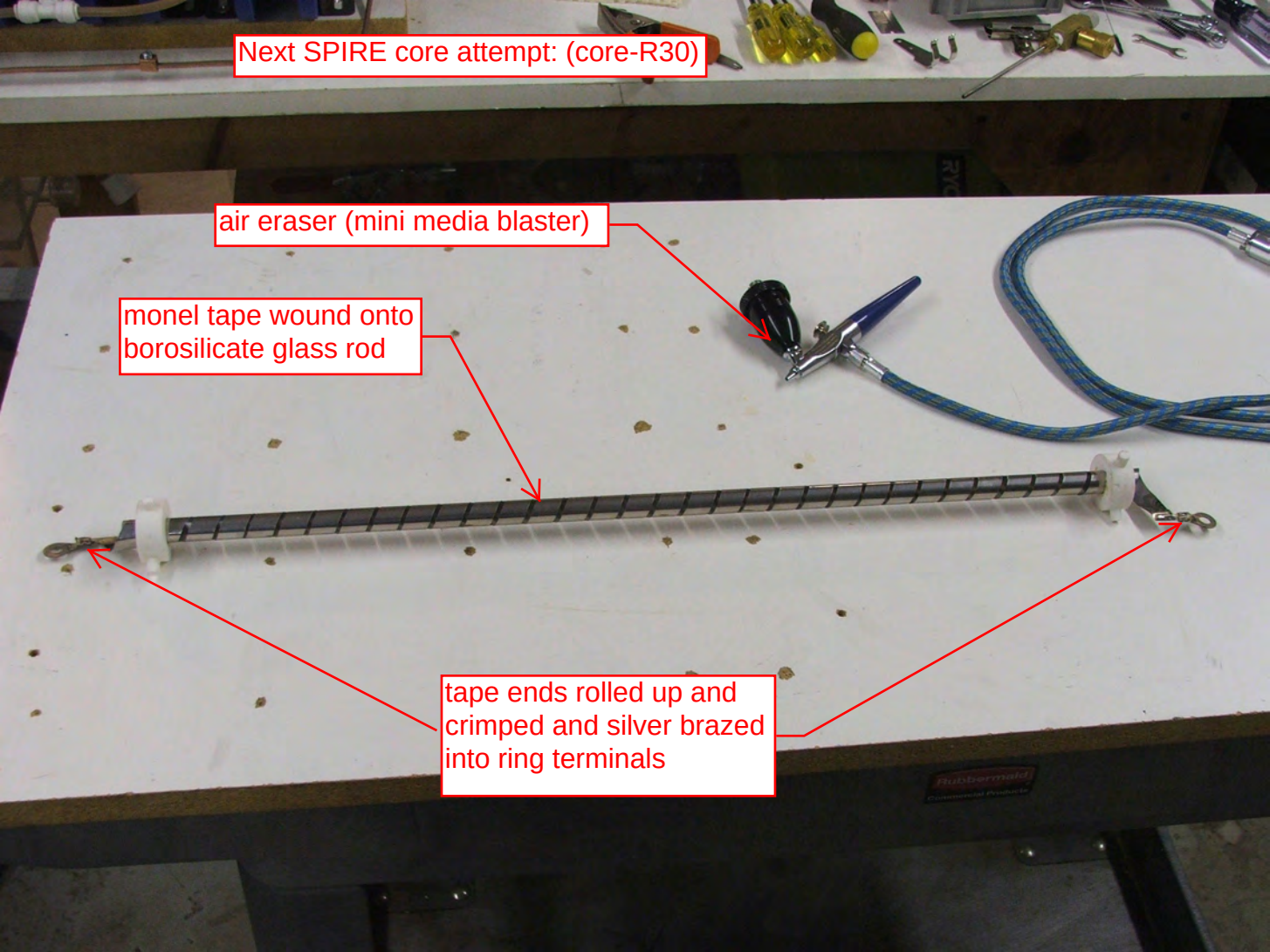


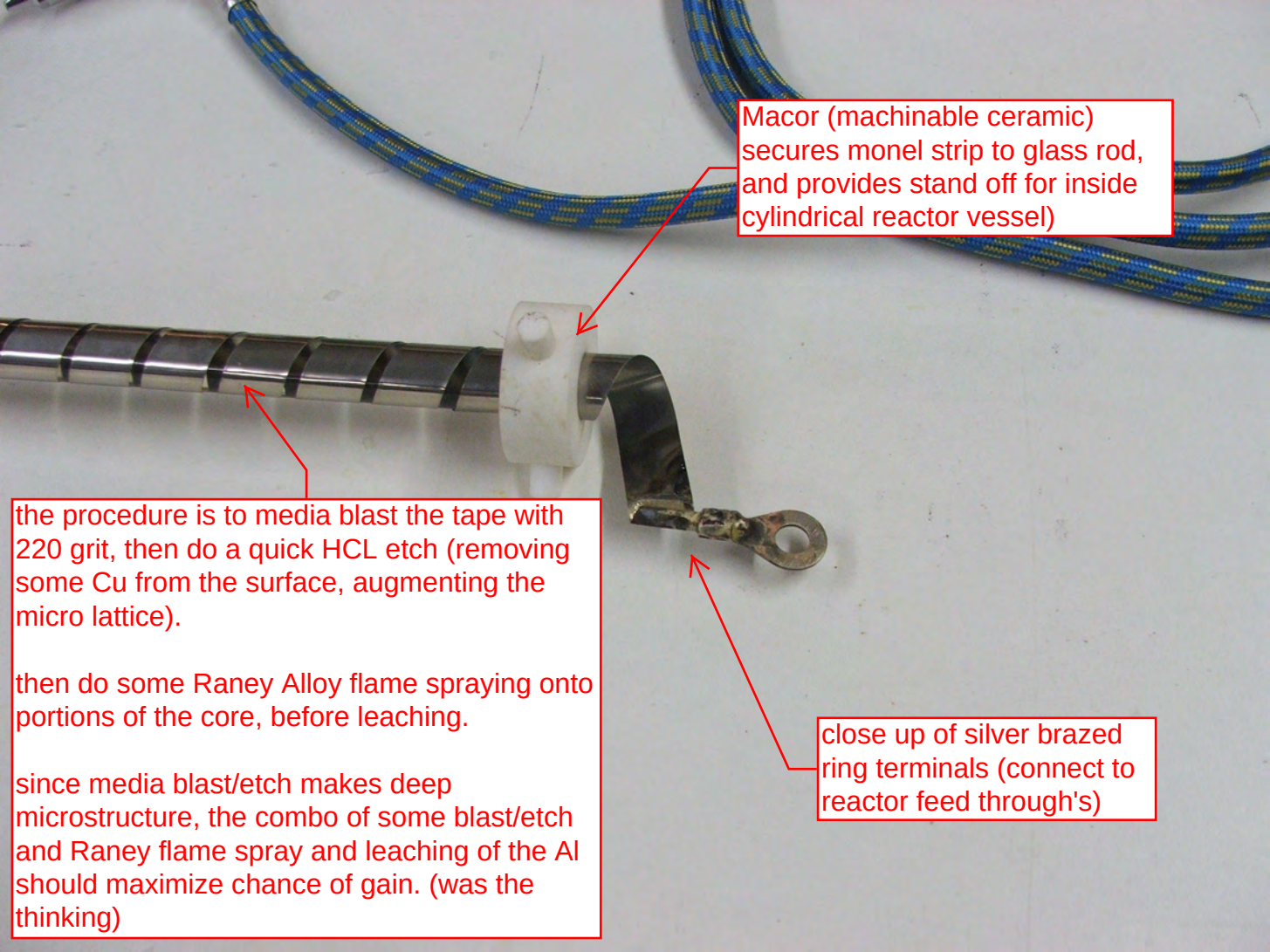
here, I've only jury rigged the SL stack for enough HHO production to do some HHO torch work. So it's mains, Variac driving a welding transformer (step down to max 40V at up to 60A) into a FW bridge of 70A capacity. And it's right now smoothed by a bank of 15 caps @9500 µF (it runs much better being PWM from a battery as source, but this power source stays constant for the torch work)

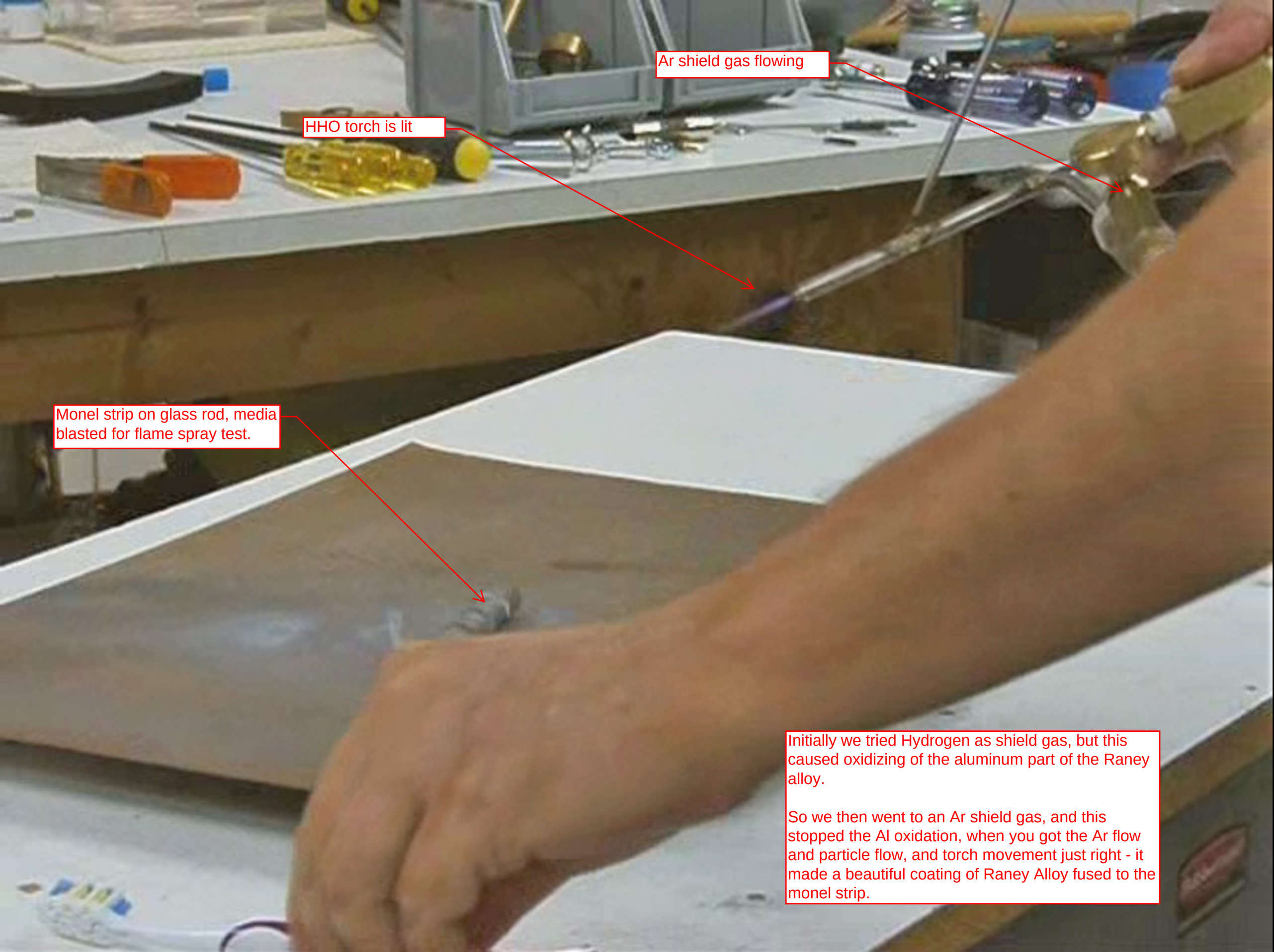
monitoring V, I and P into the cell stack. These are a lousy cell design, and non ideal power supply, however it gets the job done to supply the flame spray torch.

True Power: The DSO has math channels, and the purple channel takes instant V x instant I to yield instant P in watts. Then this meter takes the average/mean of an integer number of cycles to yield True Power.


mini Flame Spray gun:
vibrator
Raney Alloy powder feed tube
powder cup/hopper
HHO control valve
H_2 or Ar control valve
you hold the gun in left hand, so the powder feed tube is vertical, and use right hand to place vibrator against powder cup. (powder won't flow by gravity alone)

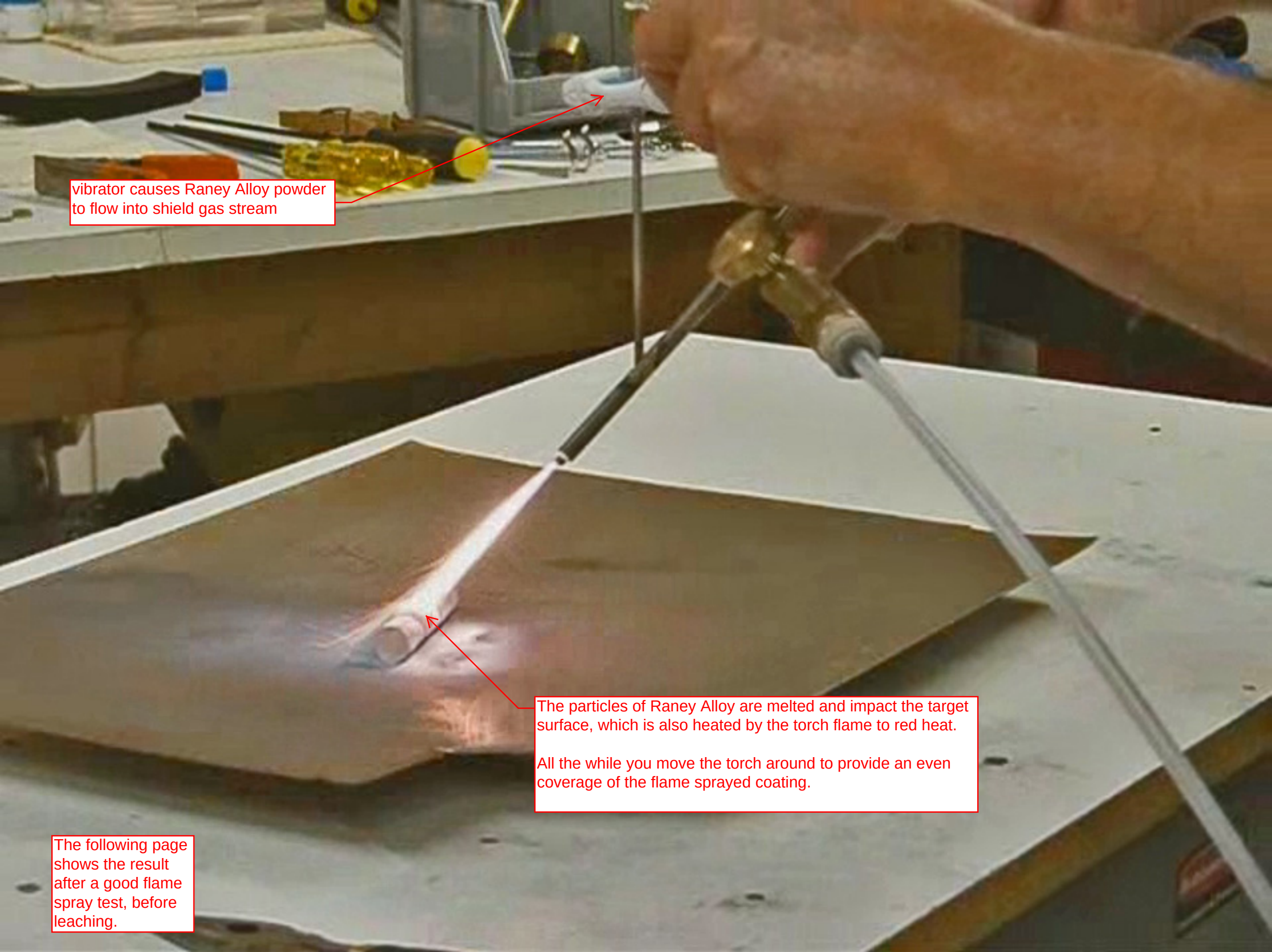

Next SPIRE core attempt: (core-R30)
air eraser (mini media blaster)
monel tape wound onto borosilicate glass rod
tape ends rolled up and crimped and silver brazed into ring terminals


Macor (machinable ceramic) secures monel strip to glass rod, and provides stand off for inside cylindrical reactor vessel)
the procedure is to media blast the tape with 220 grit, then do a quick HCL etch (removing some Cu from the surface, augmenting the micro lattice).
then do some Raney Alloy flame spraying onto portions of the core, before leaching.
since media blast/etch makes deep microstructure, the combo of some blast/etch and Raney flame spray and leaching of the Al should maximize chance of gain. (was the thinking)
close up of silver brazed ring terminals (connect to reactor feed through's)

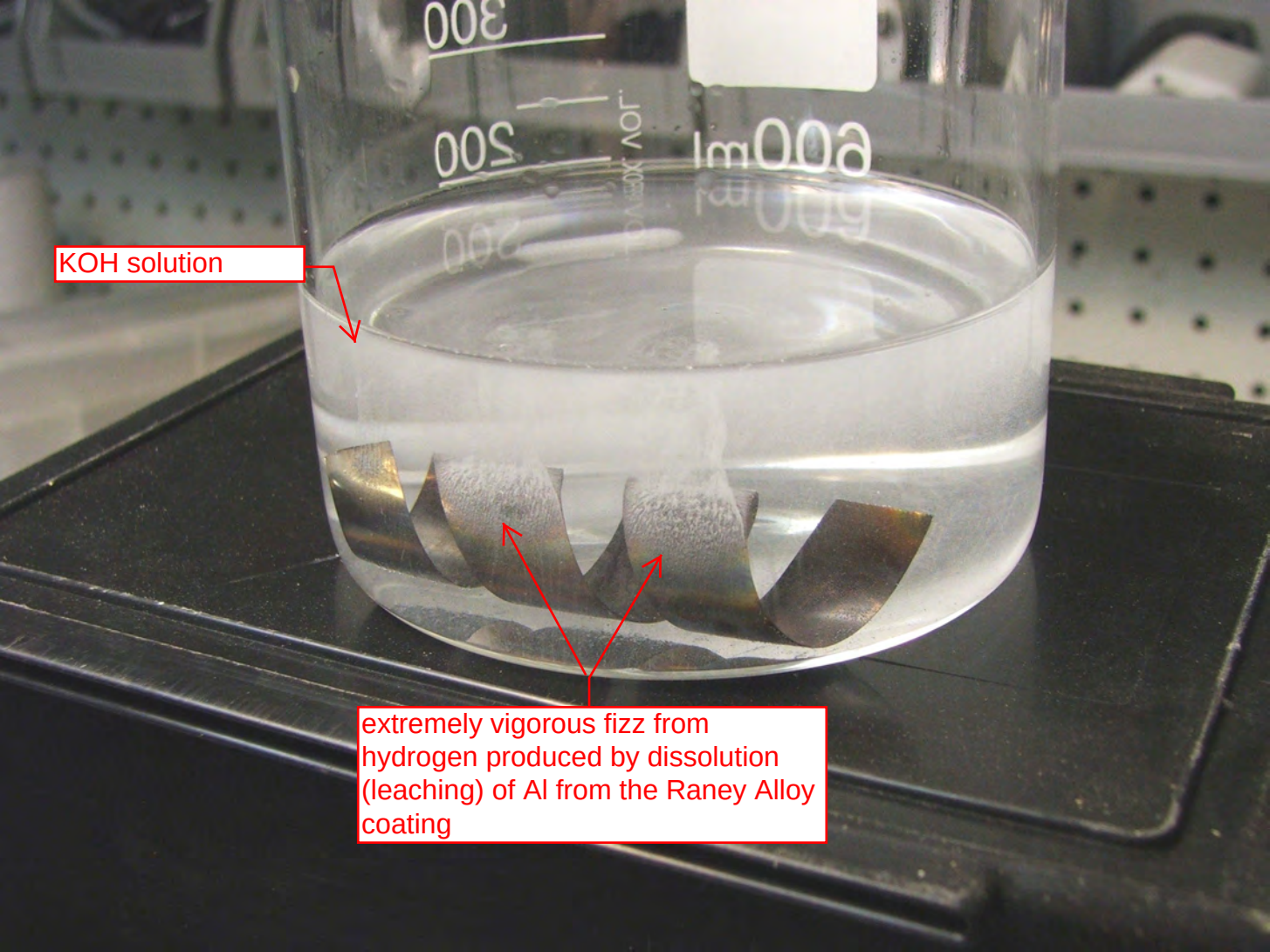


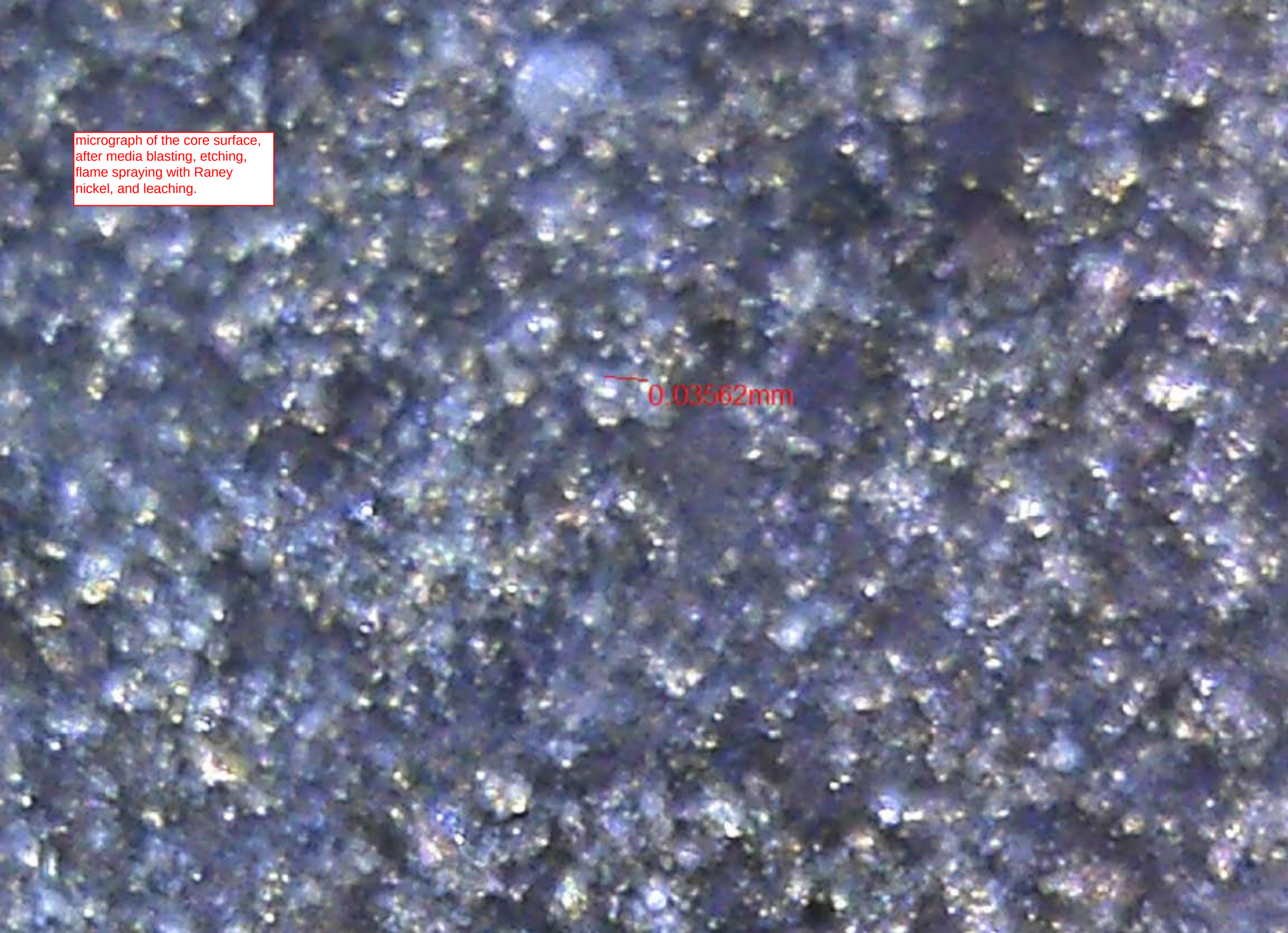
Initially we tried Hydrogen as shield gas, but this caused oxidizing of the aluminum part of the Raney alloy.

So we then went to an Ar shield gas, and this stopped the Al oxidation, when you got the Ar flow and particle flow, and torch movement just right - it made a beautiful coating of Raney Alloy fused to the monel strip.


vibrator causes Raney Alloy powder to flow into shield gas stream
The particles of Raney Alloy are melted and impact the target surface, which is also heated by the torch flame to red heat.
All the while you move the torch around to provide an even coverage of the flame sprayed coating.
The following page shows the result after a good flame spray test, before leaching.

2.86mm


KOH solution
extremely vigorous fizz from hydrogen produced by dissolution (leaching) of Al from the Raney Alloy coating



micrograph of the core surface, after media blasting, etching, flame spraying with Raney nickel, and leaching.