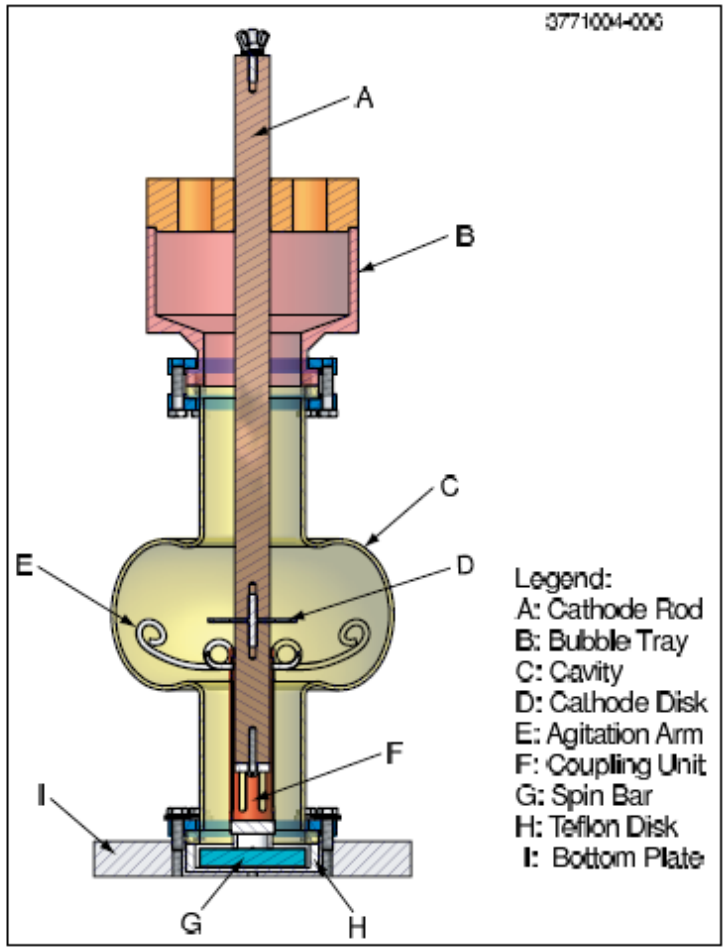
ILC R&D at Cornell

- Upgrade Facilities for BCP, HPR, and testing for 9-cell ILC cavities
  - Complete
- Develop Vertical EP for 9-cell ILC cavities
  - Moving forward
- Develop a provisional method to tune 9-cells
  - Complete
- Results on ACCEL- 8 and ACCEL- 5
- Basic R&D for EP contamination
- New shape (re-entrant) 9-cell cavity for ACD complete

Vertical EP Development

- Qualified many times with single cells
- Best Eacc = 47 MV/m achieved in re-entrant cavity



9cell ACCEL-8 Cavity (BCP results)

BCP (Etching)

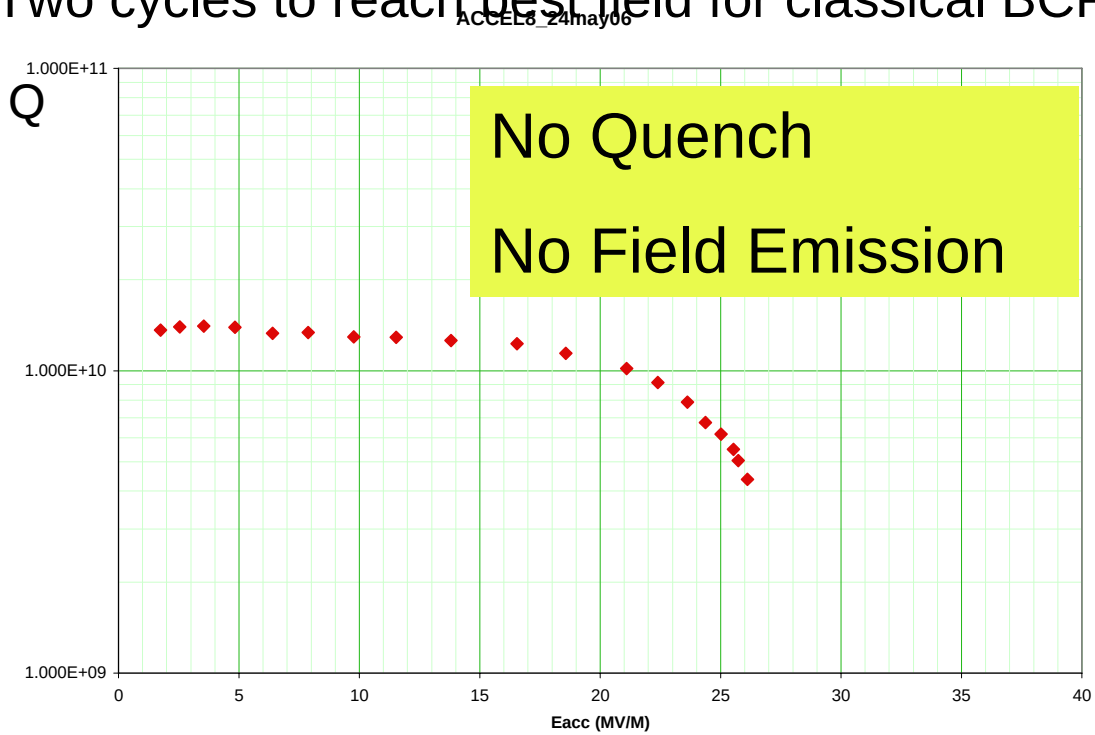
50 + 60 μm BCP (+ 50 μm at ACCEL) + HPR

No Heat treatment at 800 Deg C

Maximum field = 26 MV/m

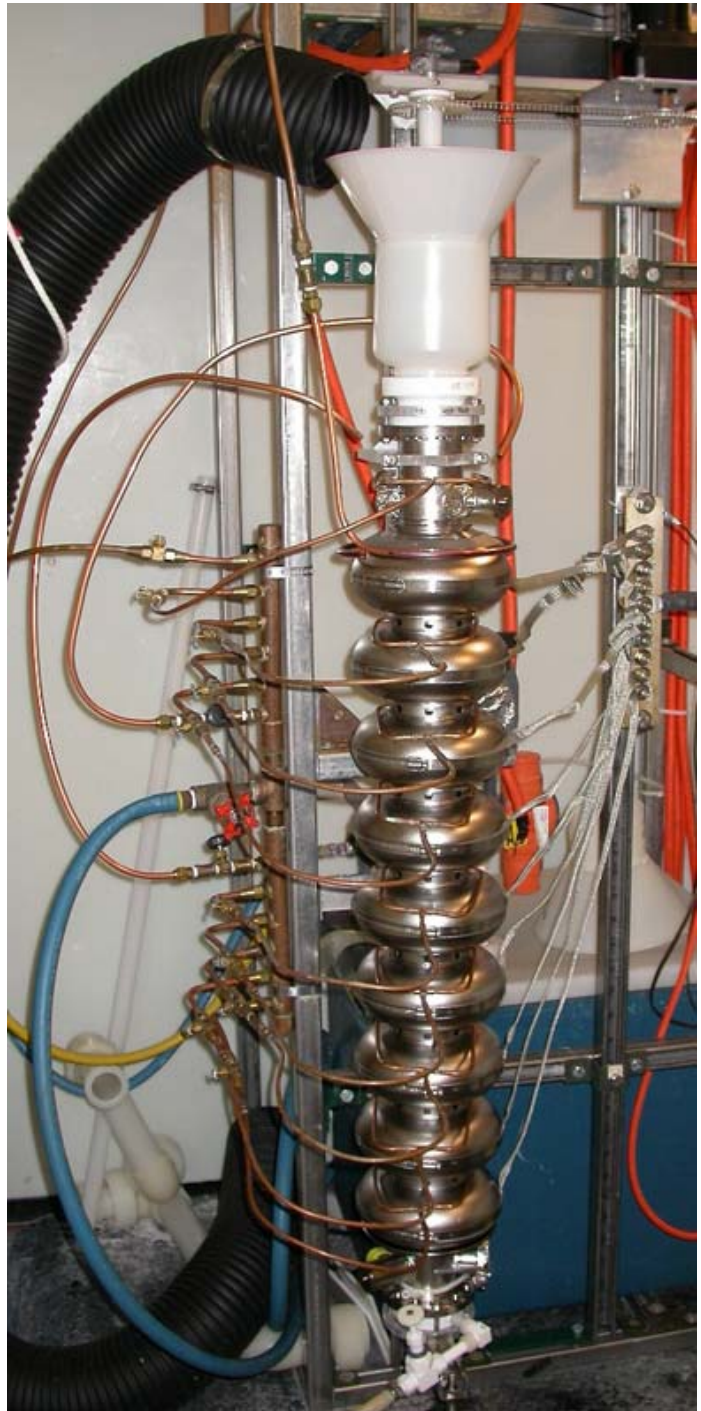
(Limit : high field Q-slope)

Two cycles to reach best field for classical BCP

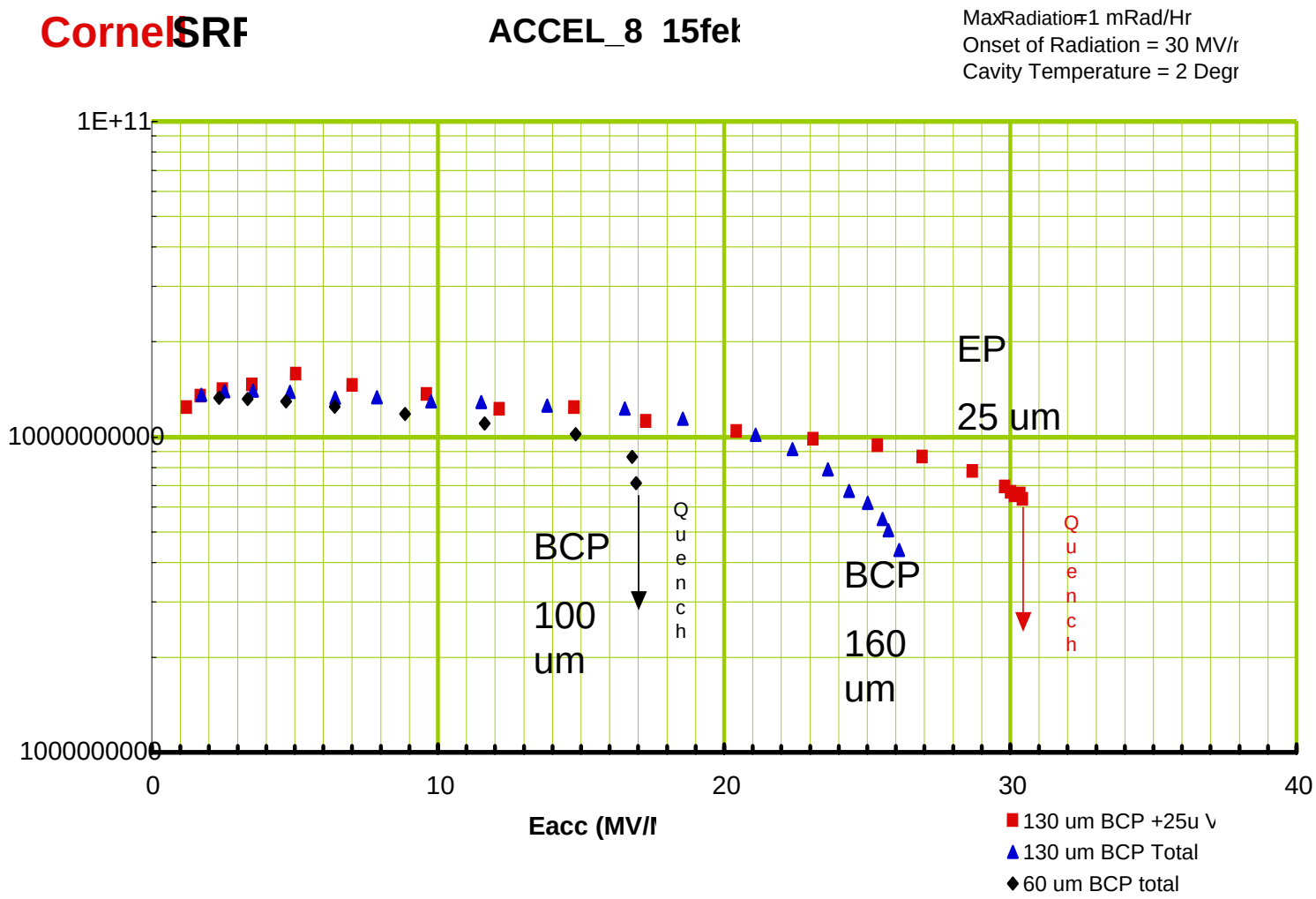


ACCEL-8 con't

- 25 microns vertical EP
- bake 110 C, 48 hours
  - Eacc = 30 MV/m
  - No field emission
  - Limit: quench
- Need to remove more material

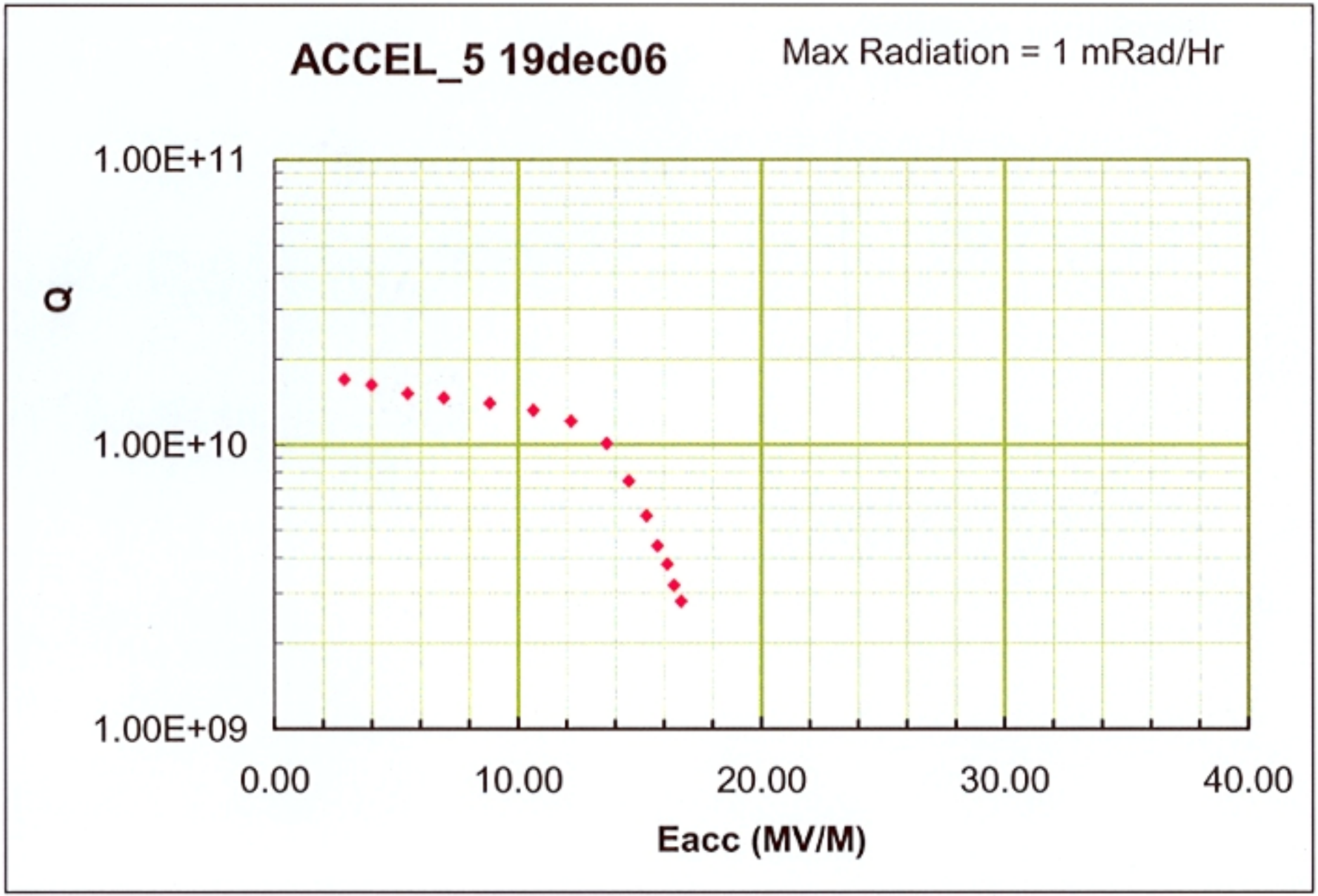


Vertical EP Moves Forward

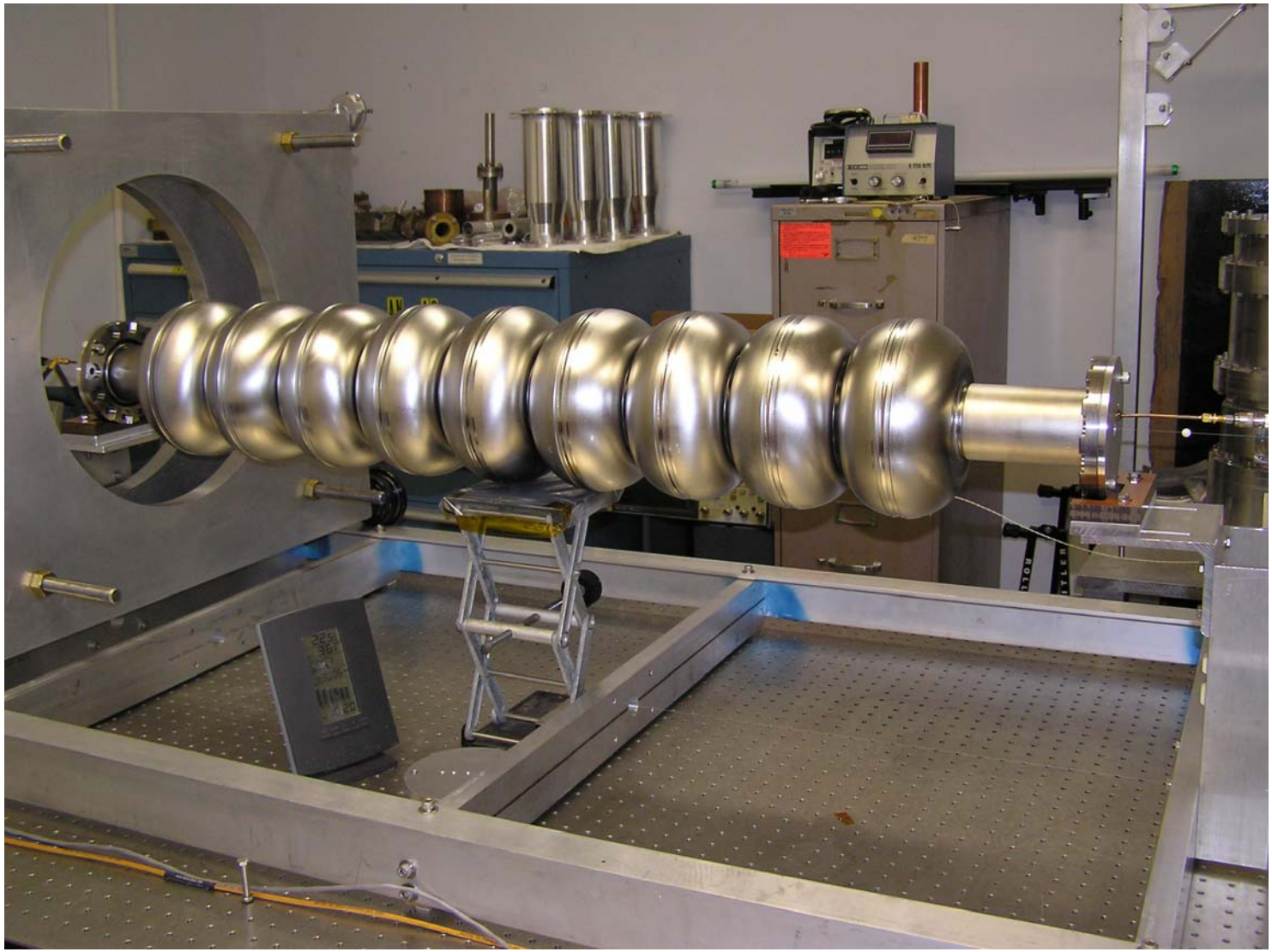


ACCEL- 5

- 120 micron vertical EP
- 600 C, 12 hour bake at Jlab to remove H
- Flash BCP (< 10 microns) + HPR & test
- Eacc = 17 MV/m (max)
- No field emission
- Need more material removal after furnace bake


ACCEL_5 19dec06
Max Radiation = 1 mRad/Hr
1.00E+11
1.00E+10
1.00E+09
σ
0.00
10.00
20.00
30.00
40.00
Eacc (MV/M)

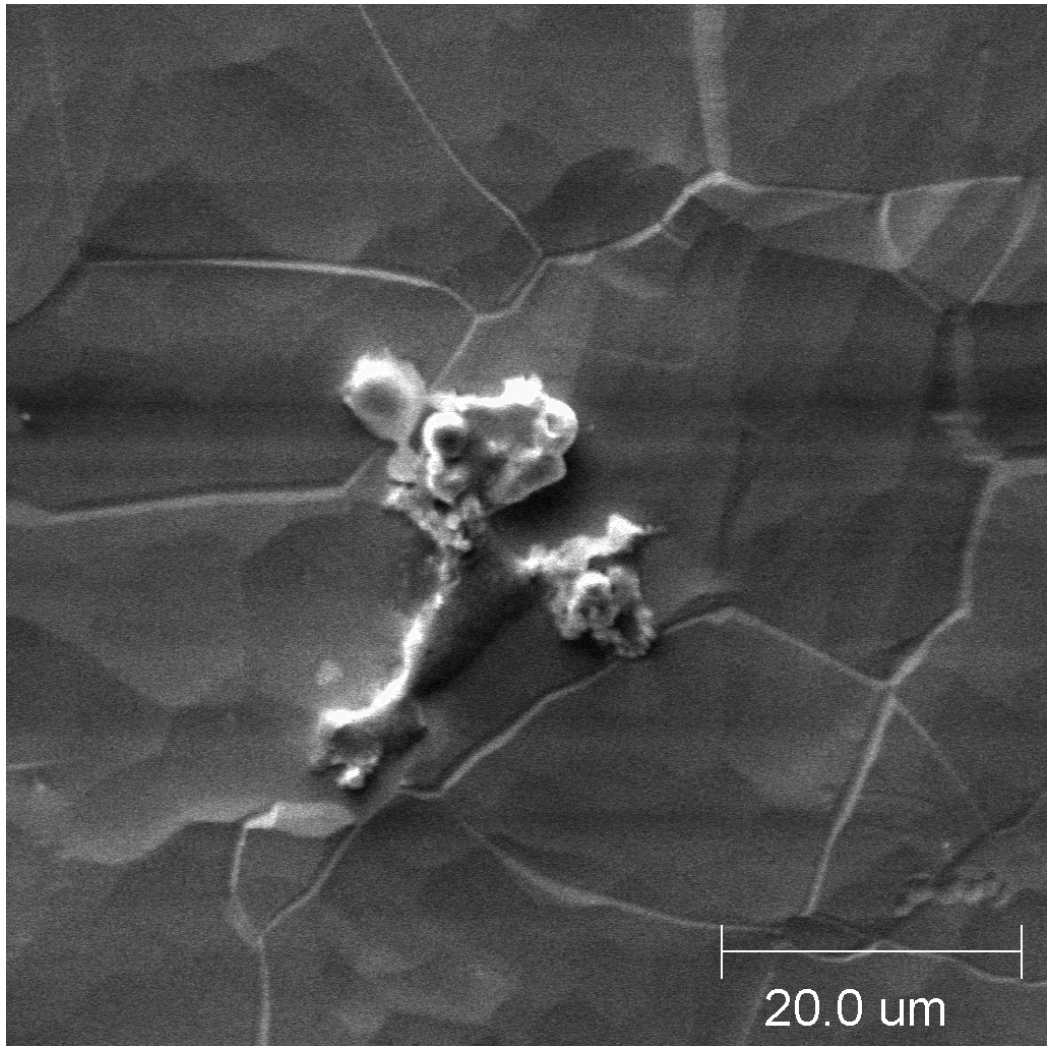
AES Built 9-cell Re-Entrant Cavity - Complete



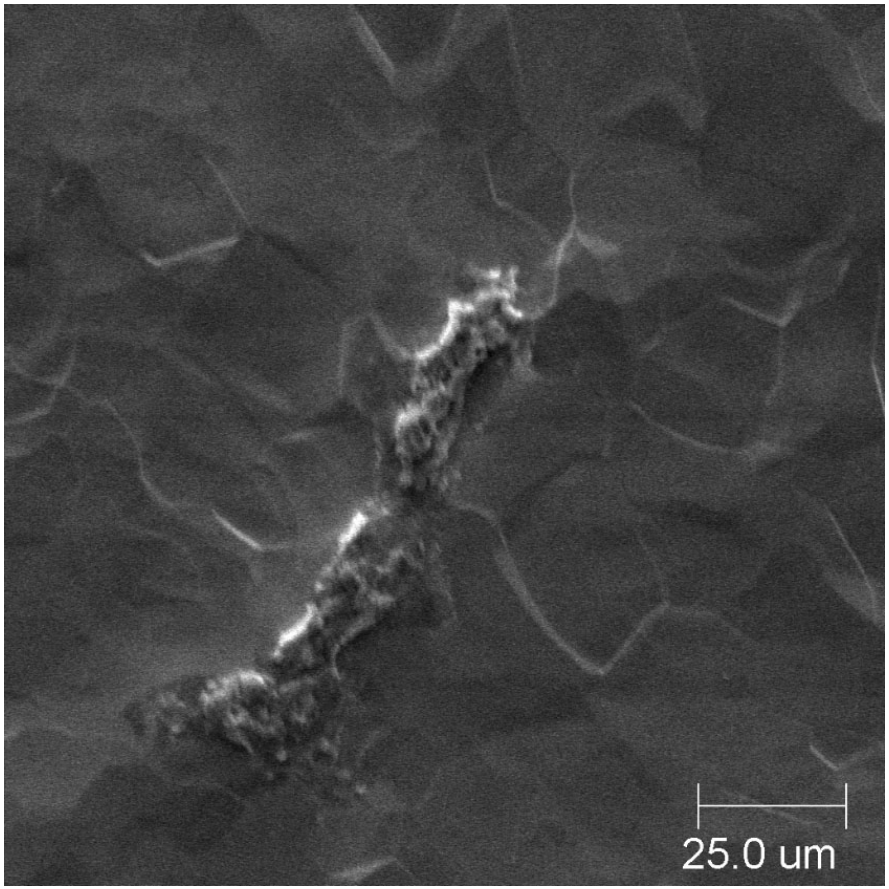
Basic Studies to Identify EP Residues That May Cause Field Emission

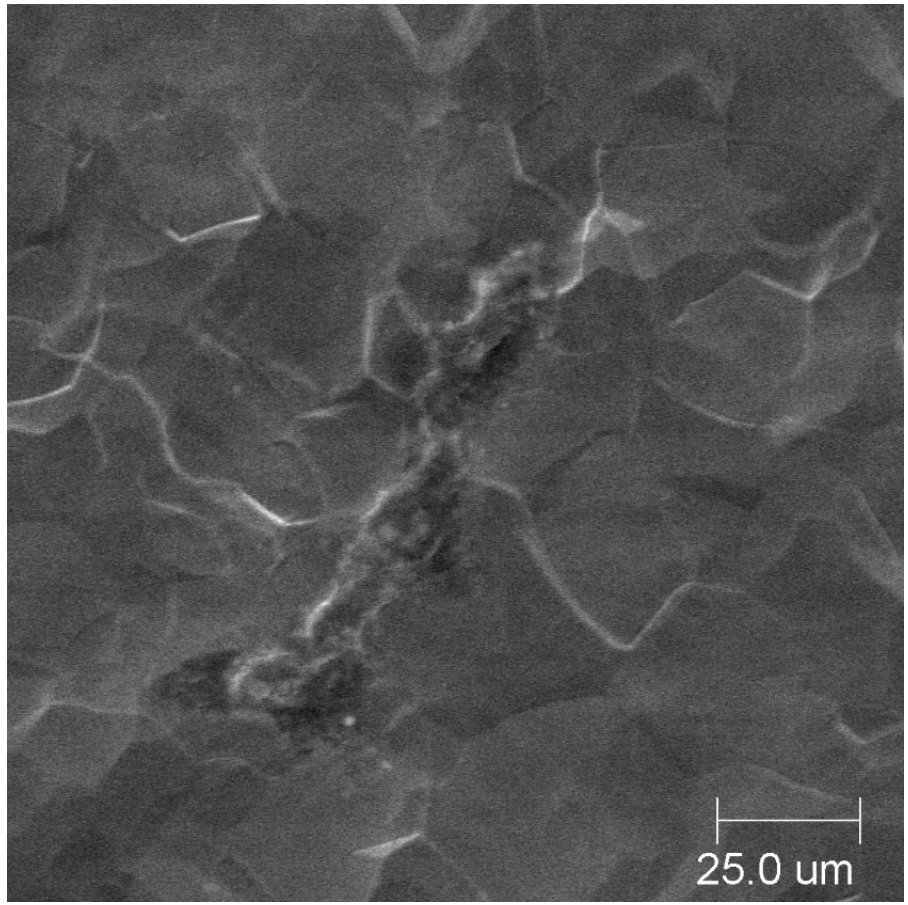
- Two main types of particles captured during EP,
  - S and niobium-oxide (most likely pentoxide)
- Traces of Al also found with Auger, as expected due to Al cathode
- S particles dissolve in ethanol rinse but leave an imprint
- Oxide particles dissolve in HF rinse

Typical S particle Deposited on Nb Surface During EP



S-Particle Before and After Ethanol Rinse





Particle dissolves but residue remains