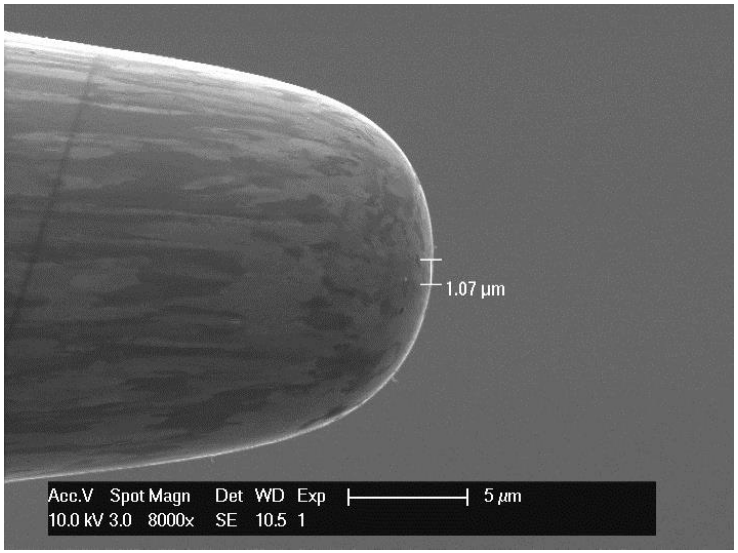
In situ SEM DC experiments in Uppsala – update 01 July 2013

Tomoko Muranaka

Preparation

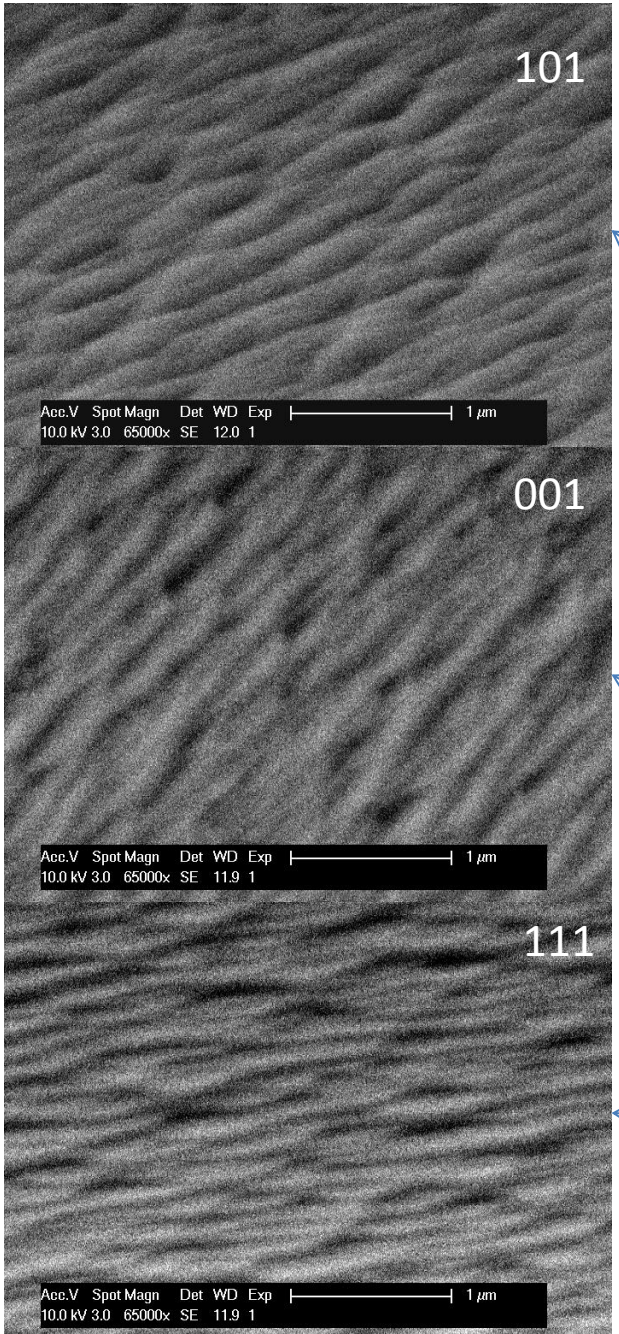
- Cathode: Copper (SLAC etching + 1040deg H2 heating)
  - EBSD analysed
- Anode: Tungsten 7um

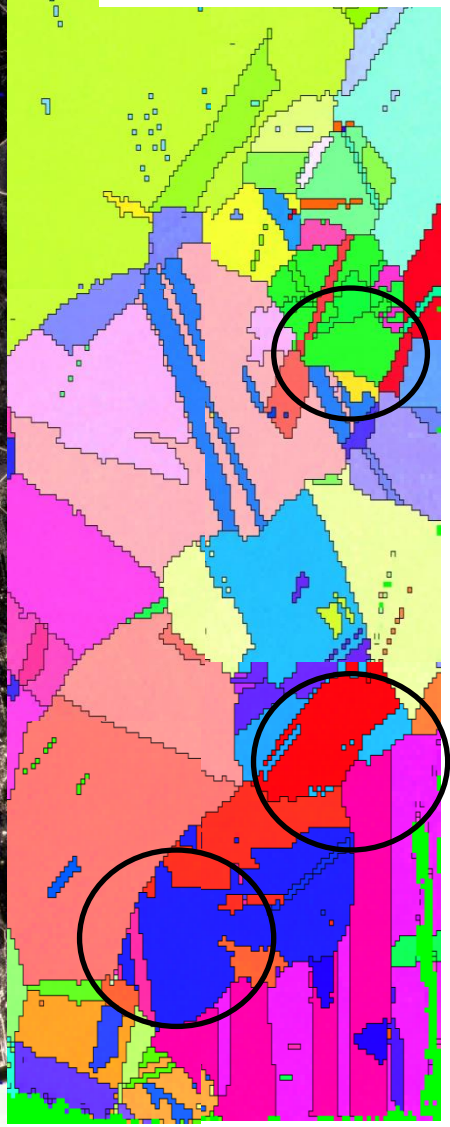


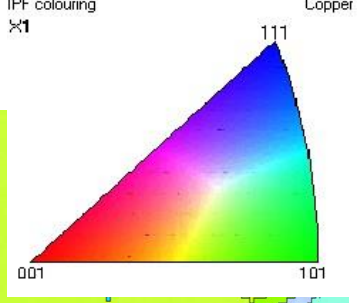
Experiments

- Grain dependent field emission measurement
  - 5 measurements on (111), (101), (001)
- Field emission stability measurement
  - 1 measurement (for 2000 points, about 30minuites) on (111), (101), (001)
- Breakdowns for warm-like feature observation
  - 1 BD on (111), (101), (001)
  - Supply 1kV at 5um gap then make the anode closer step by step until the current constantly over 1uA.

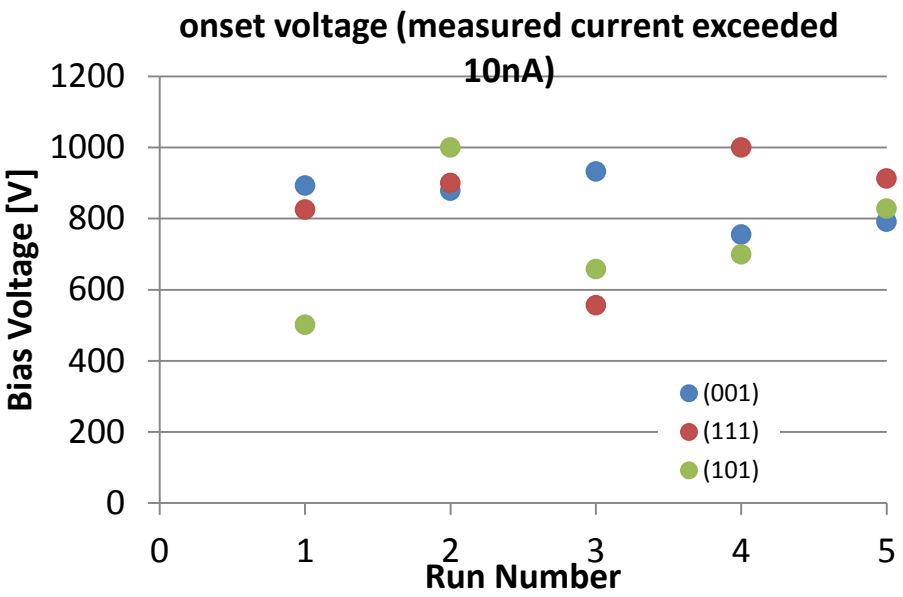
Measurement area

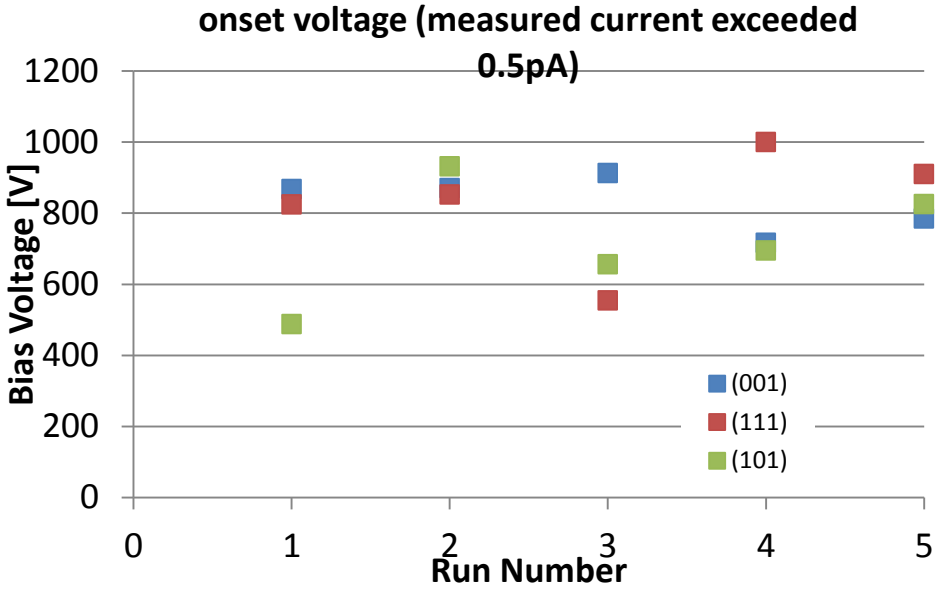






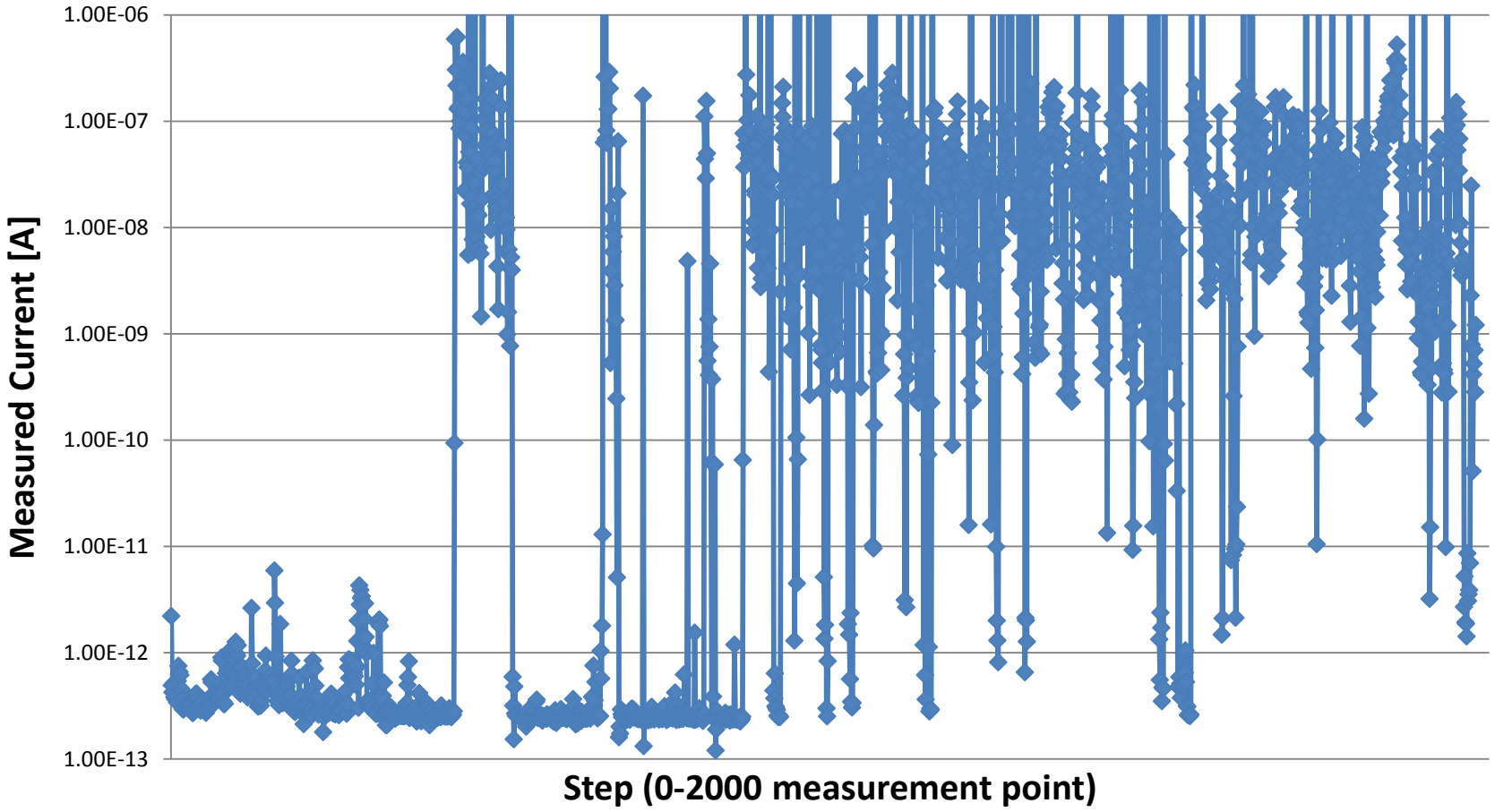
Field emission onset voltage





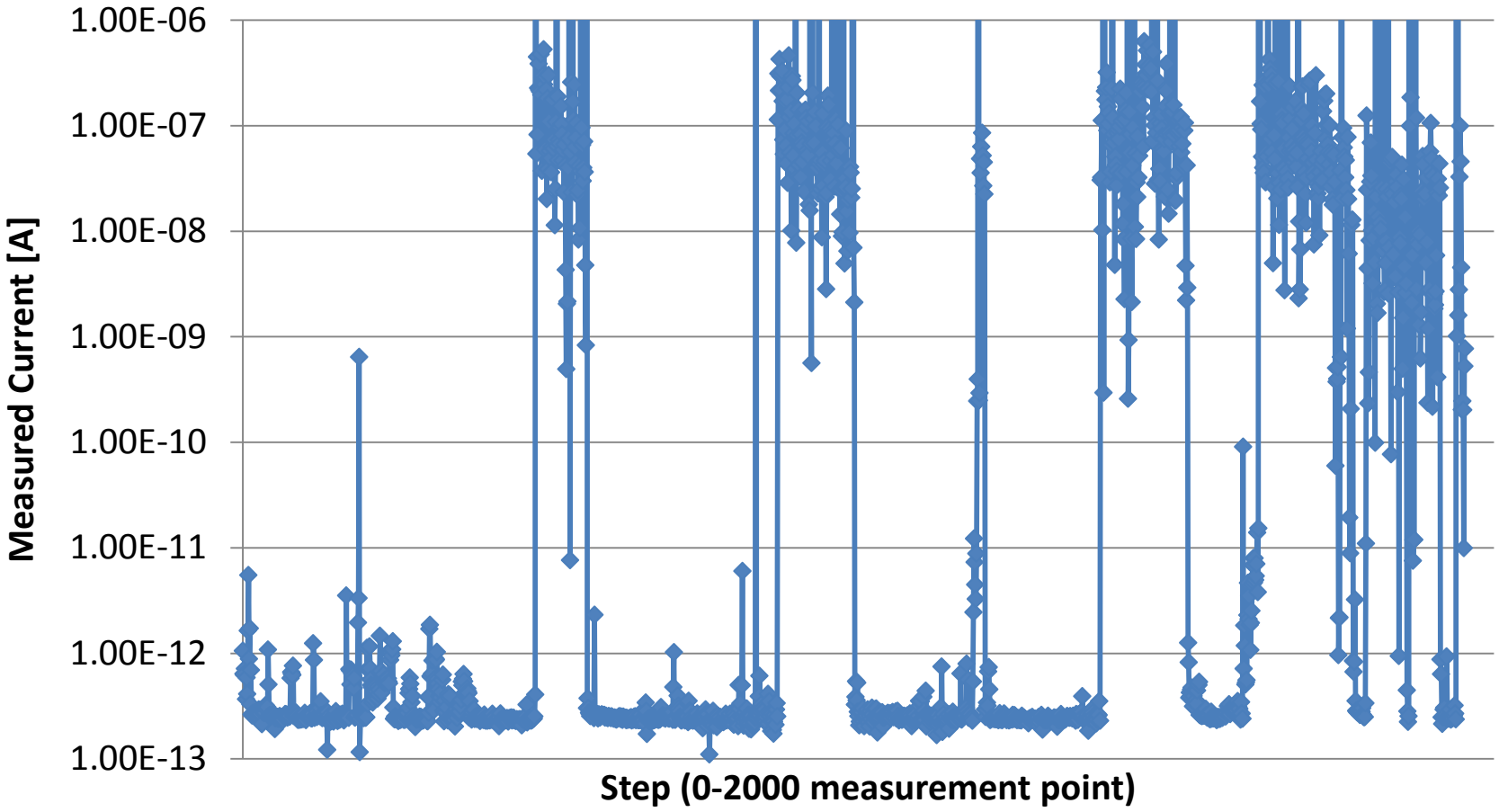
- The onset voltage varies 700-1000V except three spots (two on (101), one on (111)).

Emission stability (001), 800V

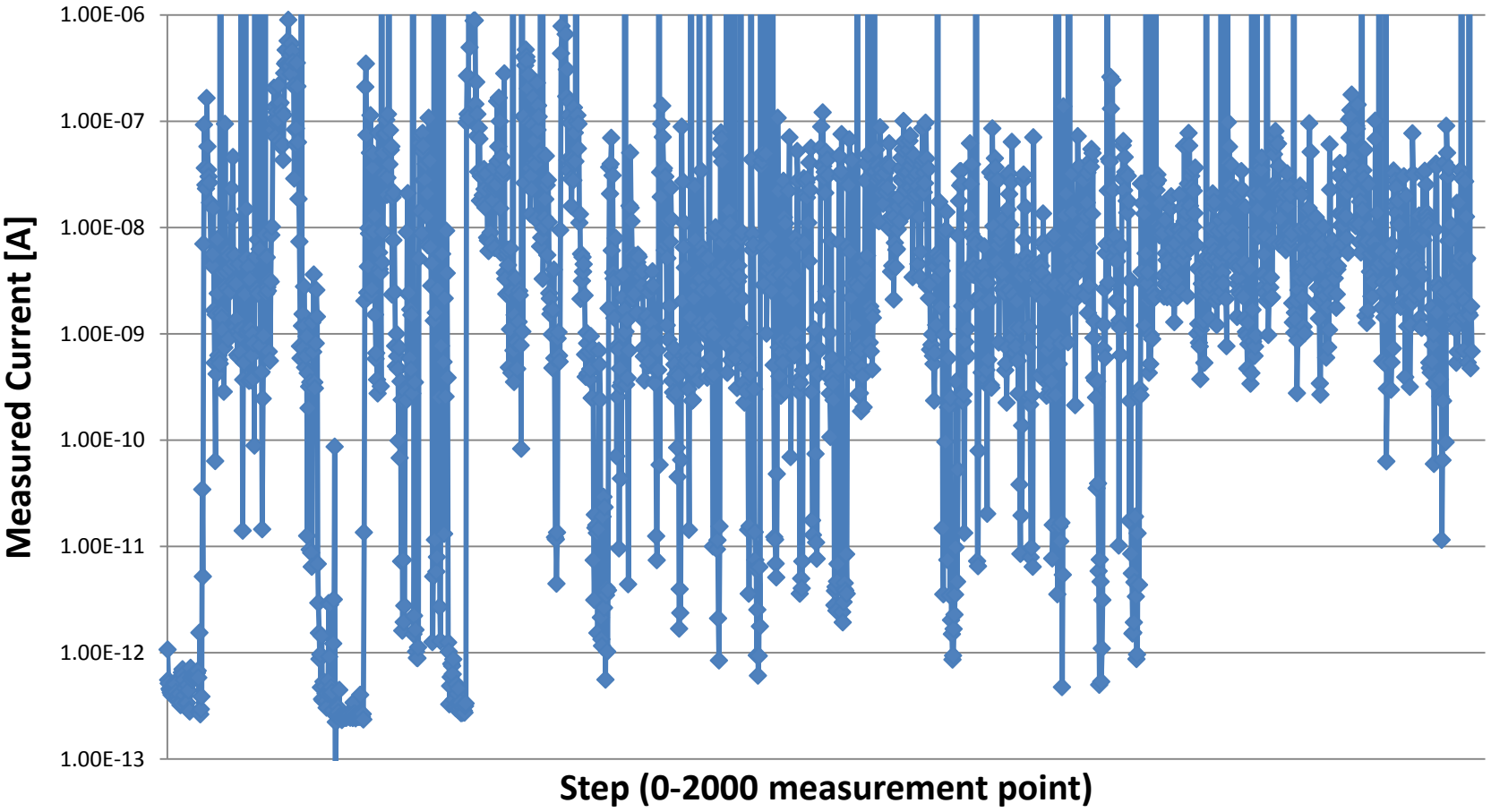


- Ramping up from 600V, “stay” if the current once exceeded 0.5pA (background was 0.2pA). 2000 meas. points ~ 30minuites

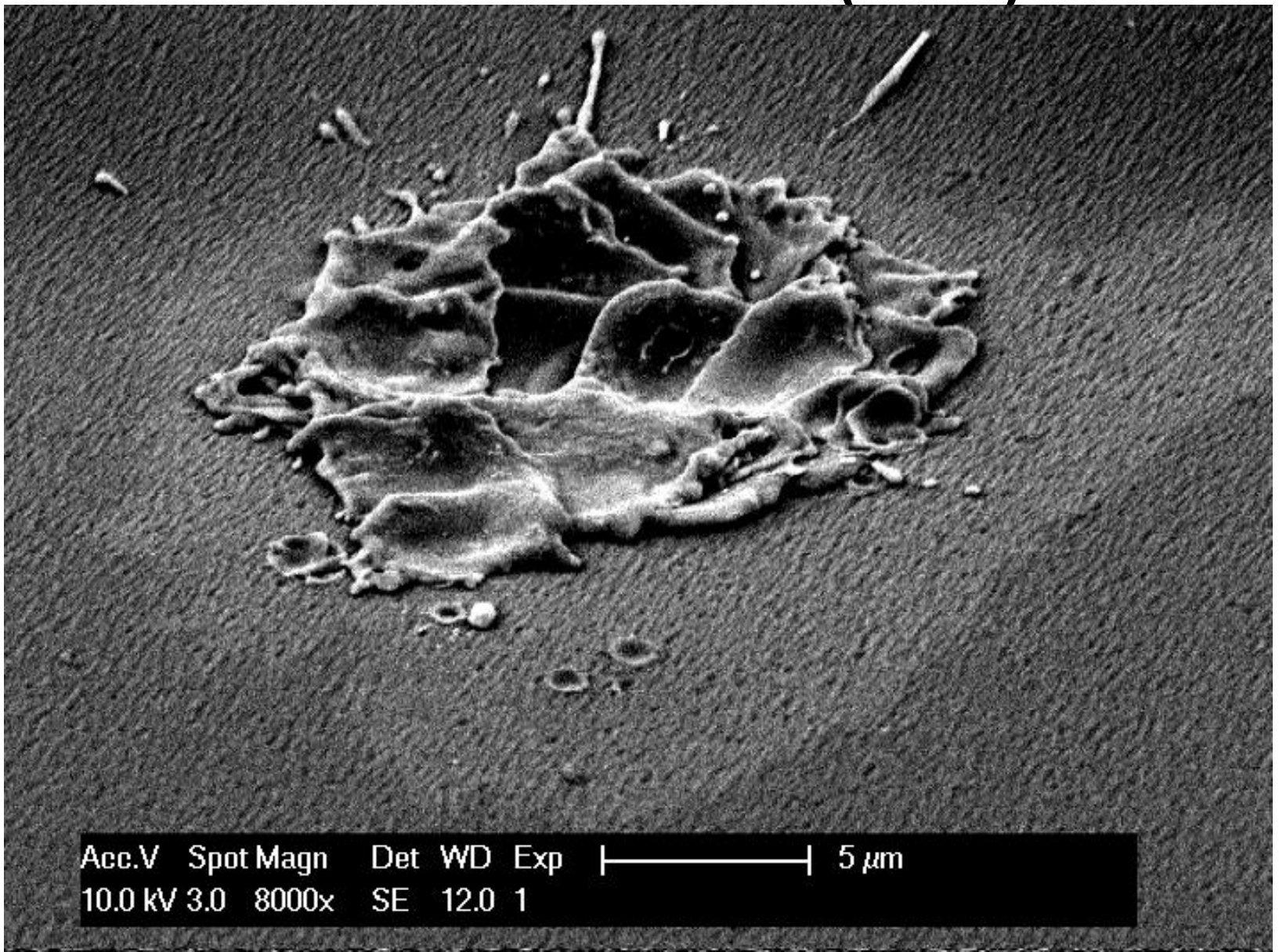
Emission stability (101), 600V



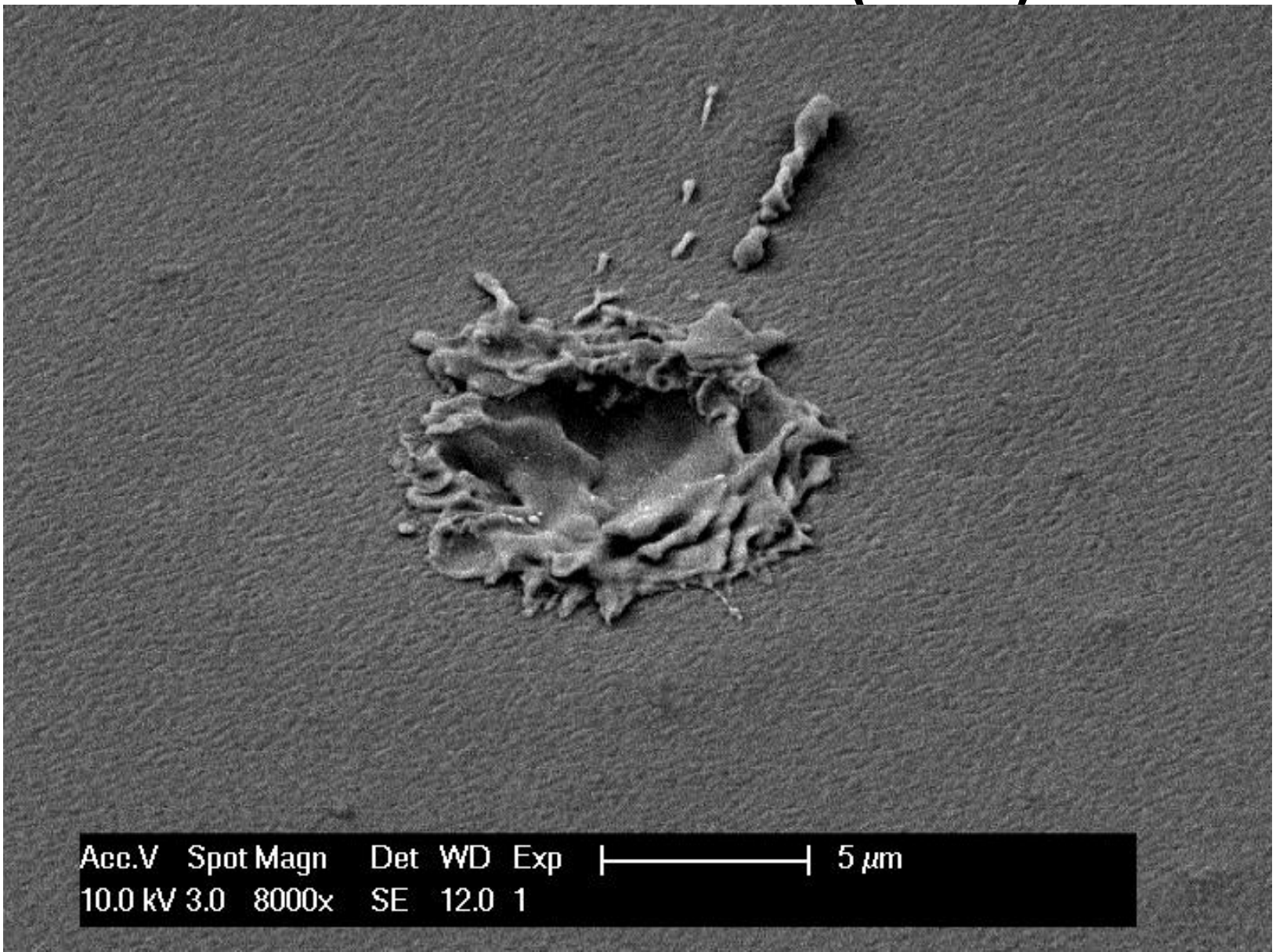
Emission stability (111), 990V



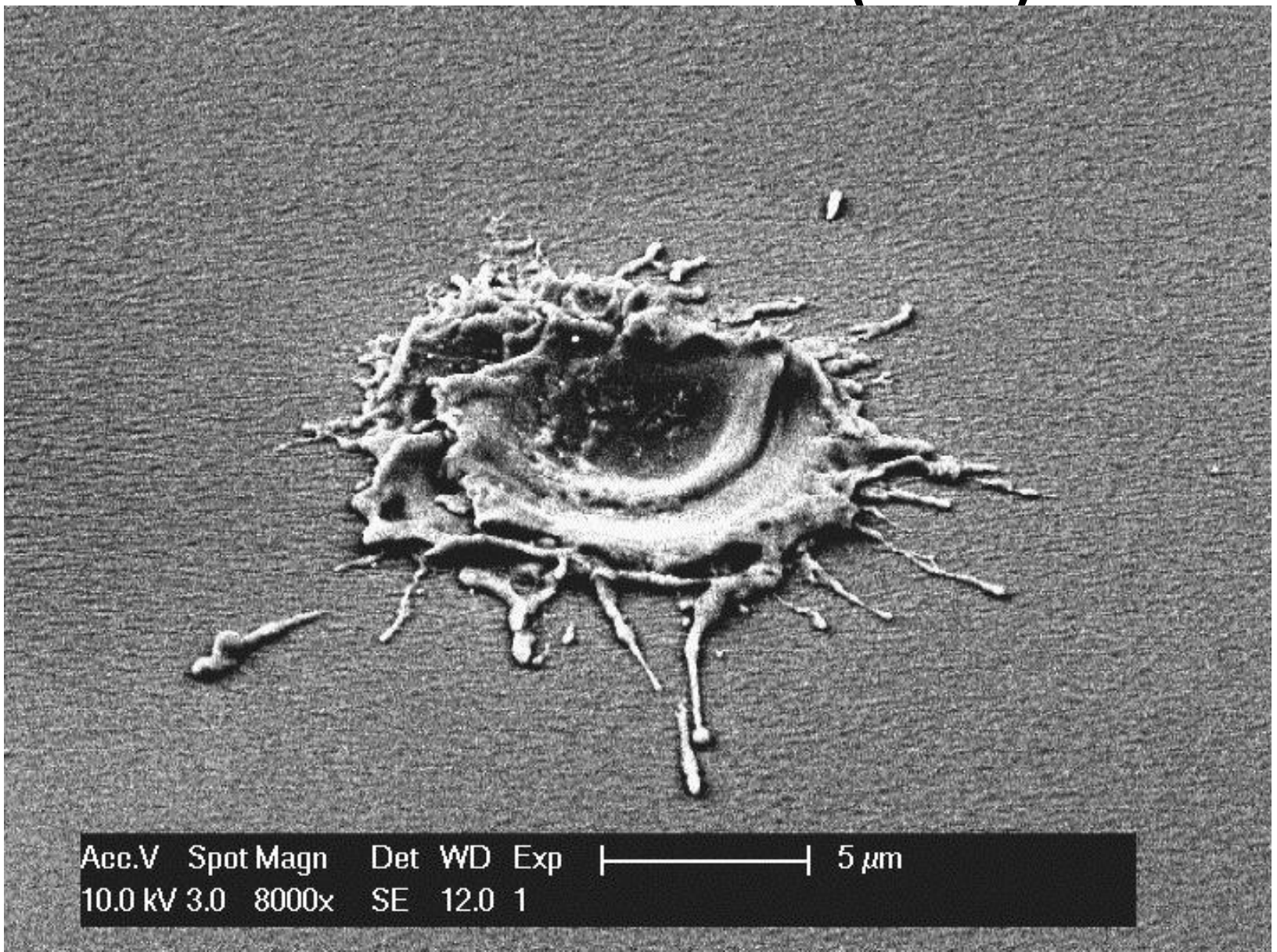
Breakdown site (001)



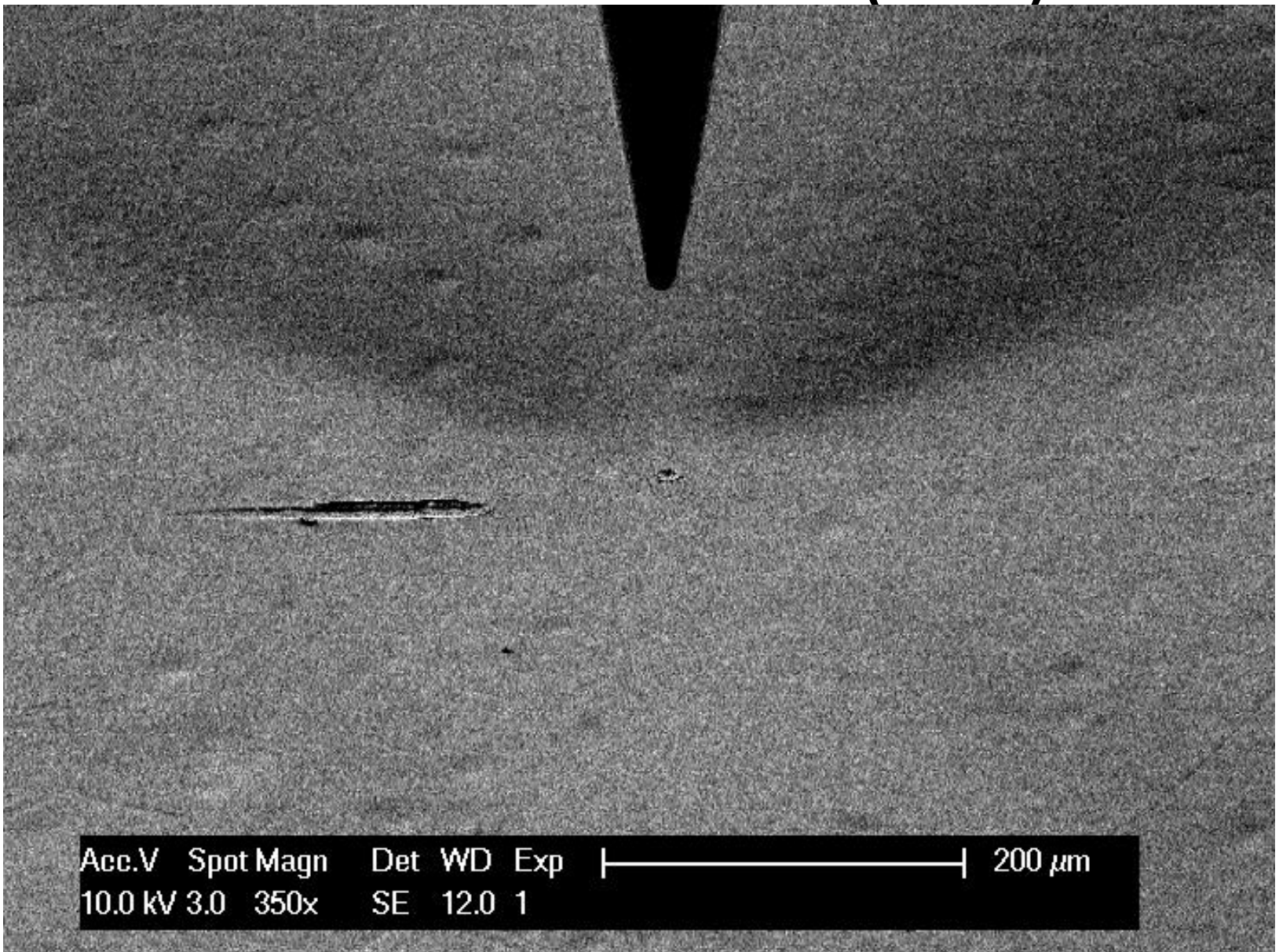
Breakdown site (101)



Breakdown site (111)



Breakdown site (111)



Anode tip after three BD