

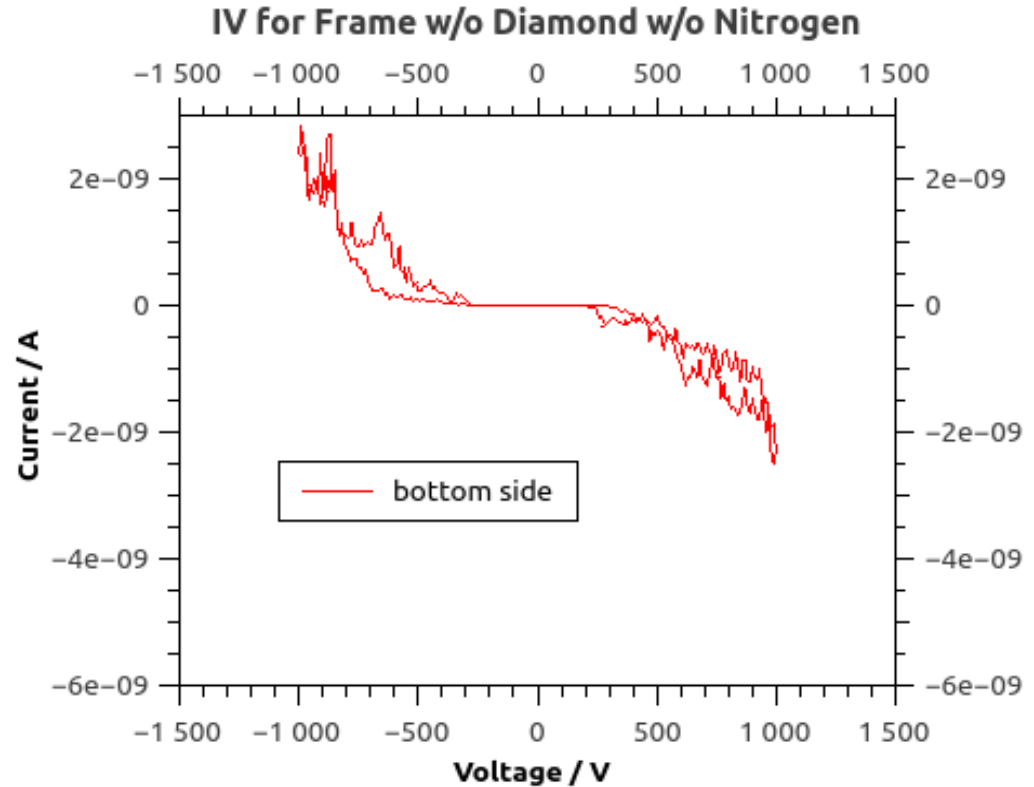
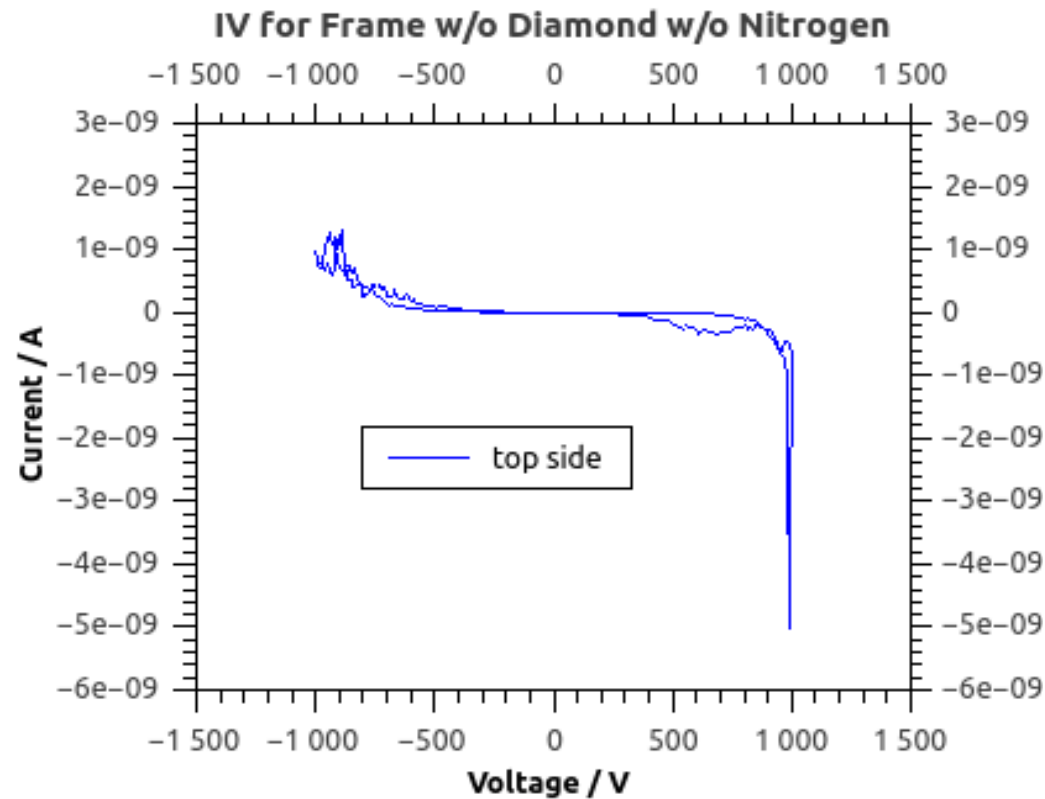
IV characterisation problems of **BCM1F** sc irradiated diamonds



Olena Karacheban
CMS group meeting
16 Sep 2013

Because of problems with reproduction of IV curves we go to **frame w/o diamond** measurements

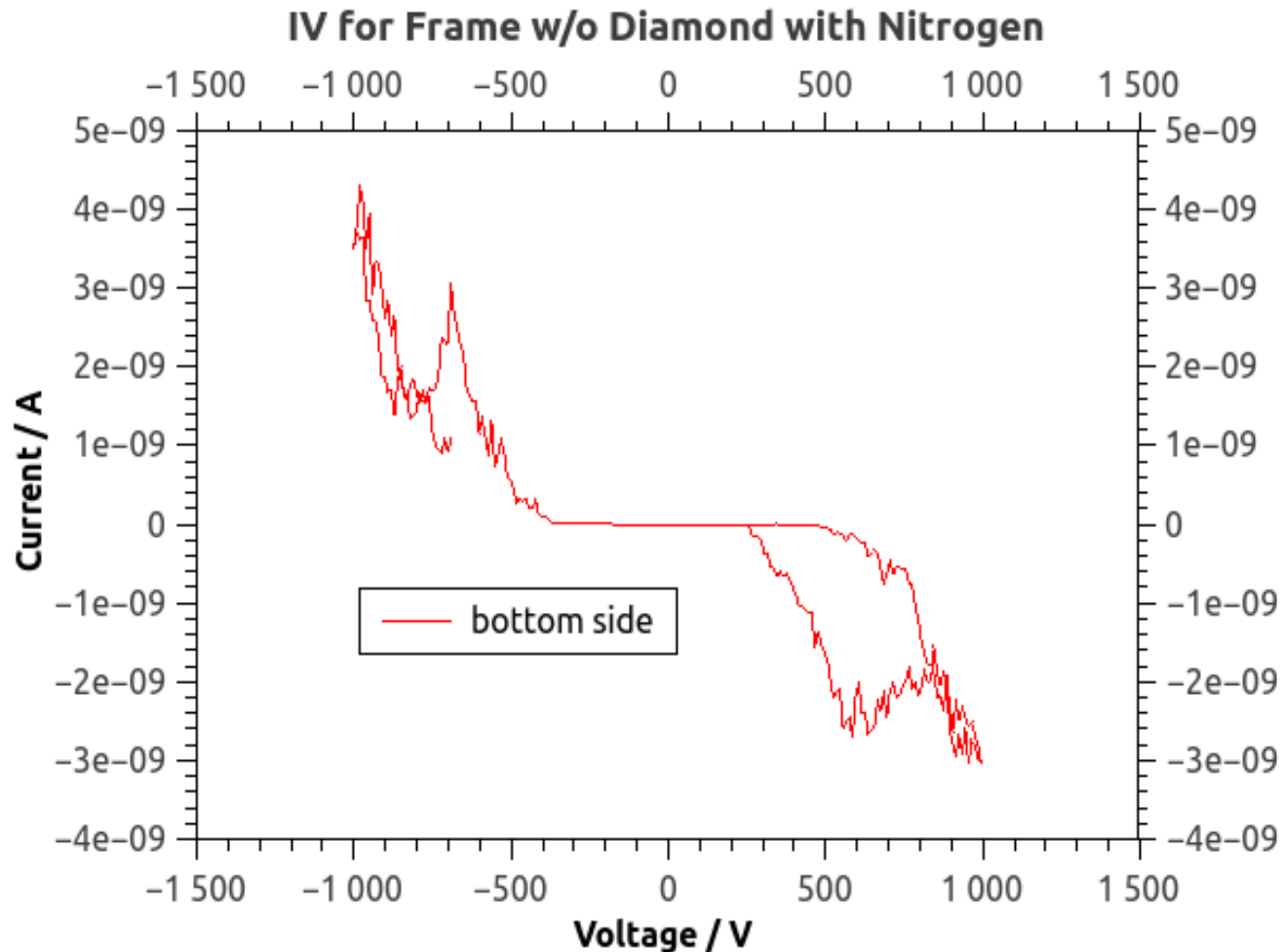
Current max for frame only is few nA value for both : positive and negative voltageage.



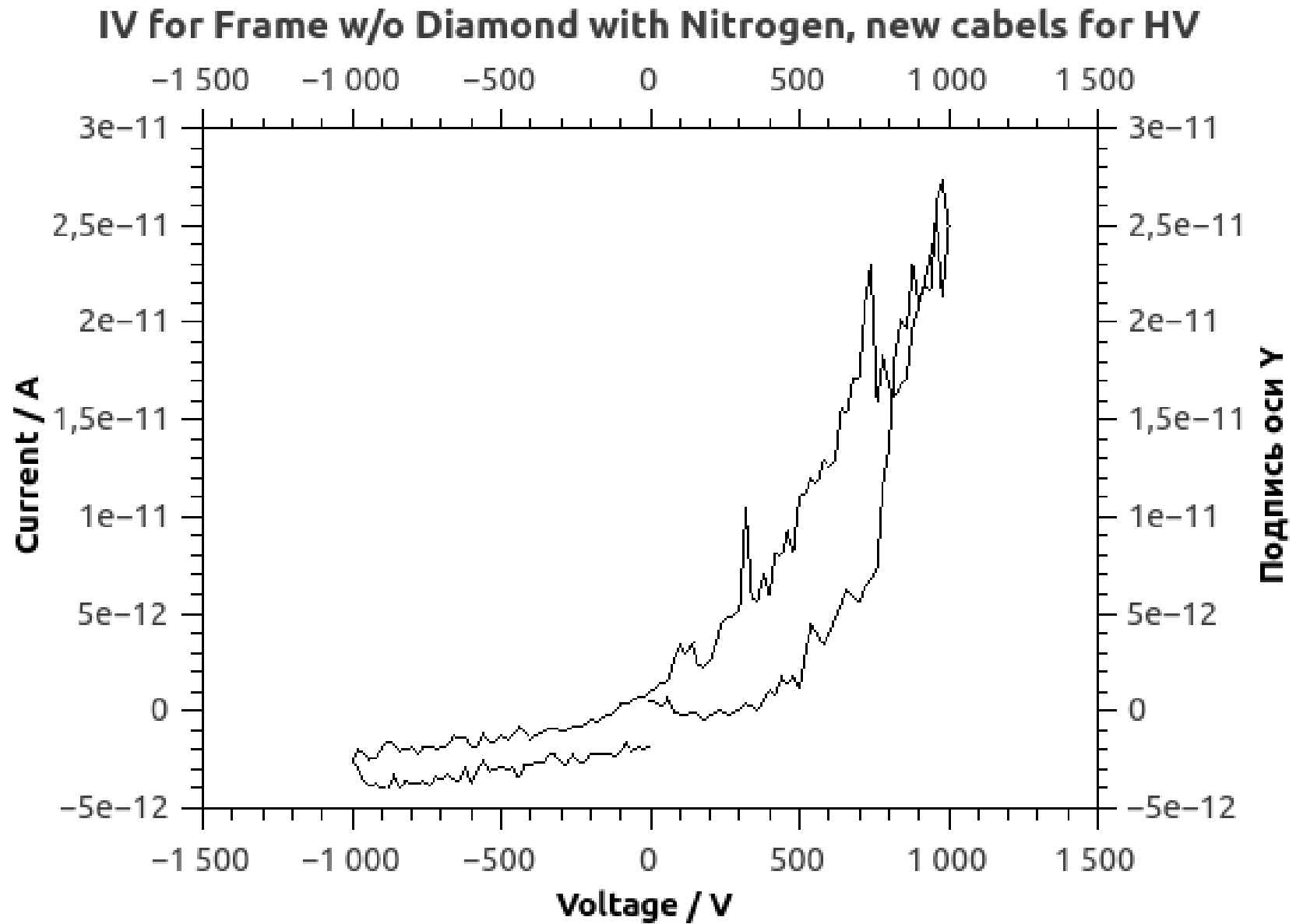
Frame w/o diamond with Nitrogen

Current max for frame only is few nA value:

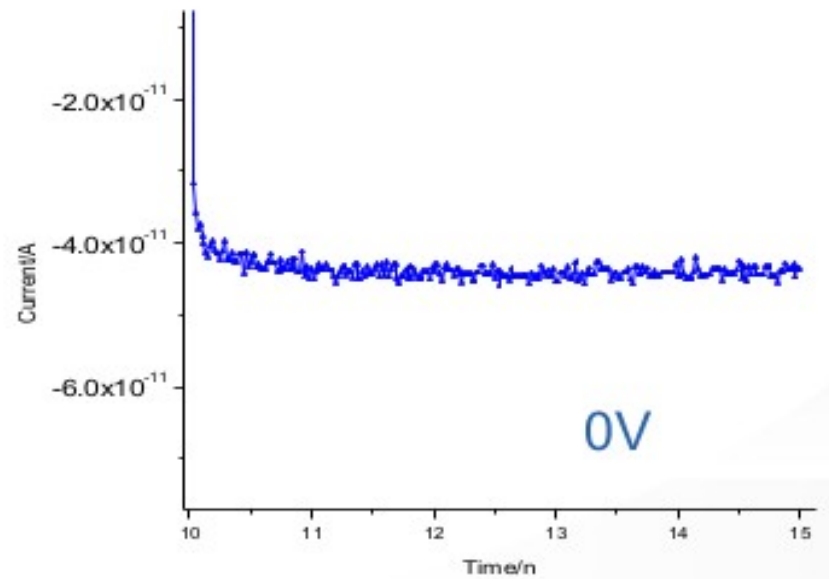
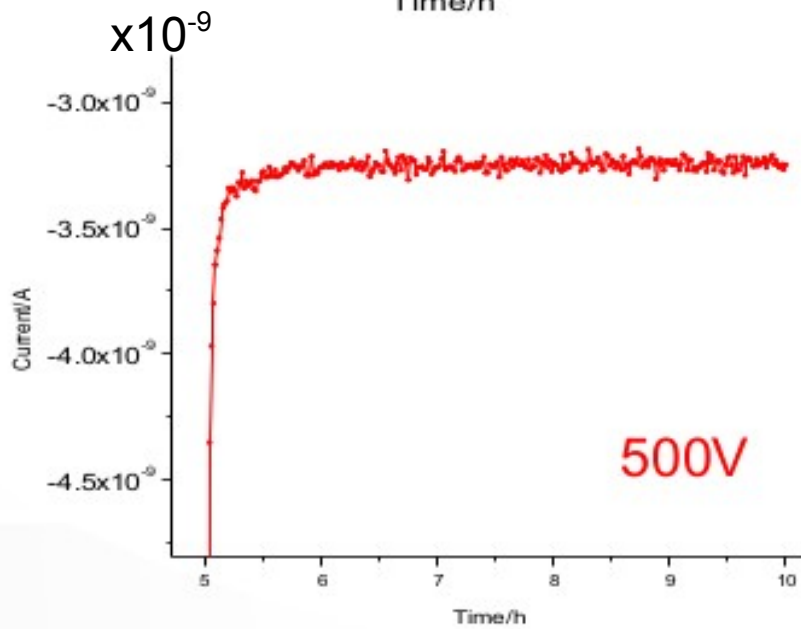
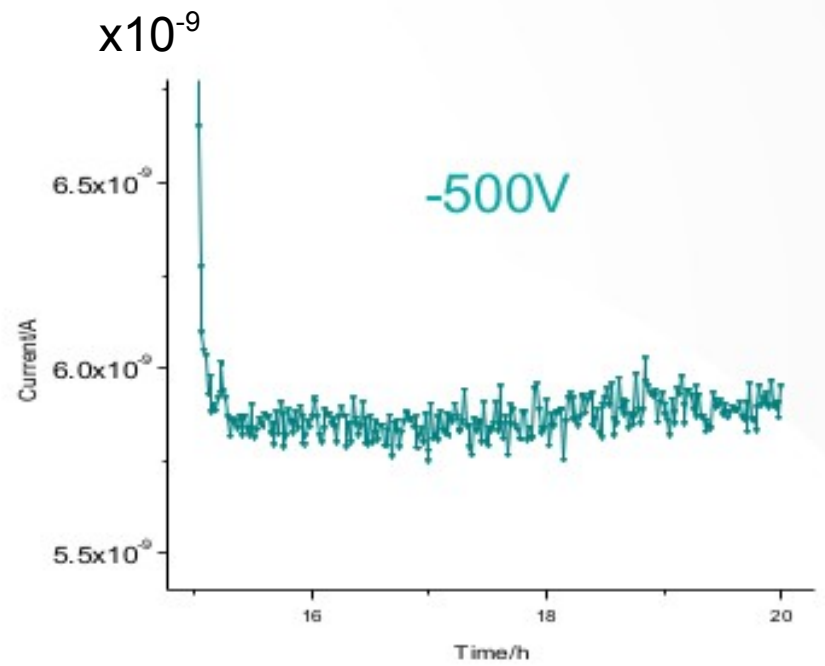
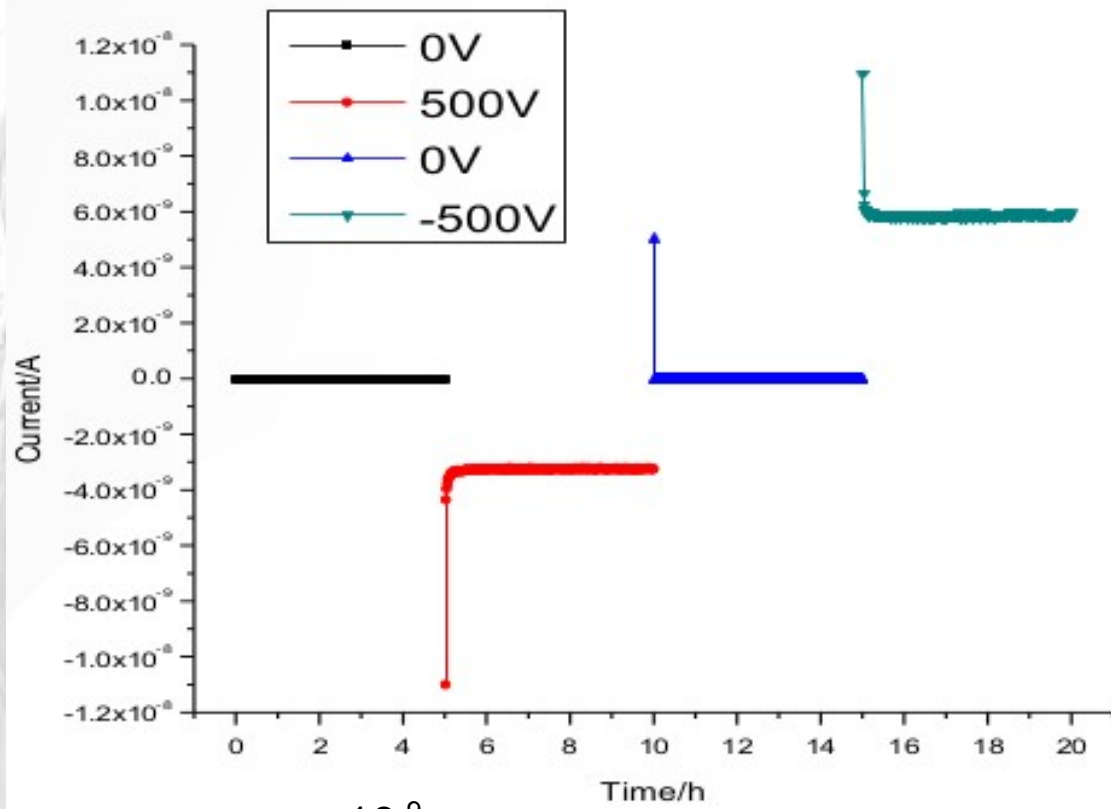
- for positive and negative voltage;
- for measurements with nitrogen and w/o nitrogen.



Wires for HV were changed



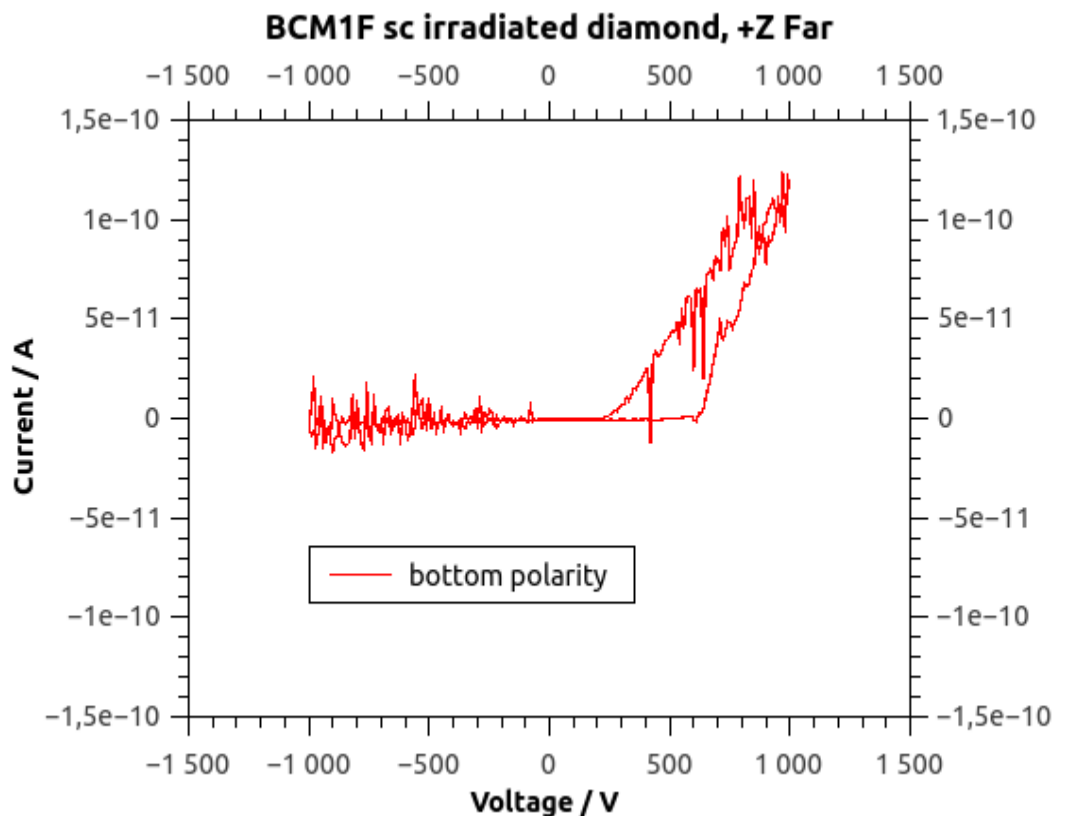
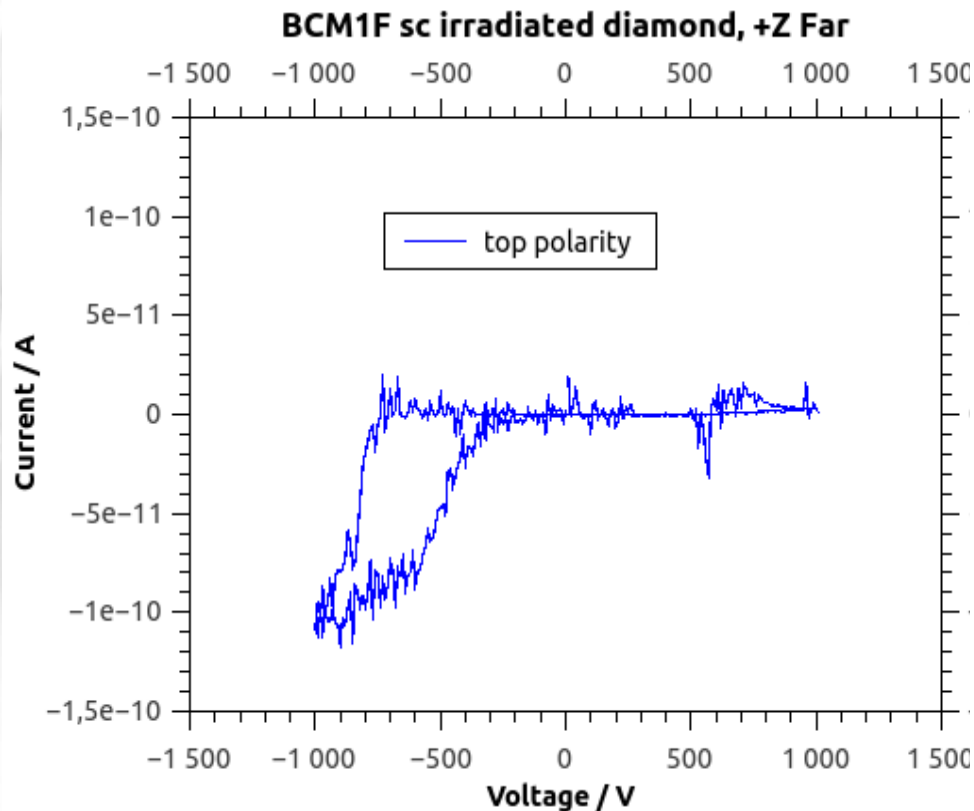
* +Z Far



IV characterisation +Z Far diamond

current for measurements with source for -500V is $6 \times 10^{-9} \text{A}$, for 500V it is $-3.5 \times 10^{-9} \text{A}$. → for measurement w/o source it should be less.

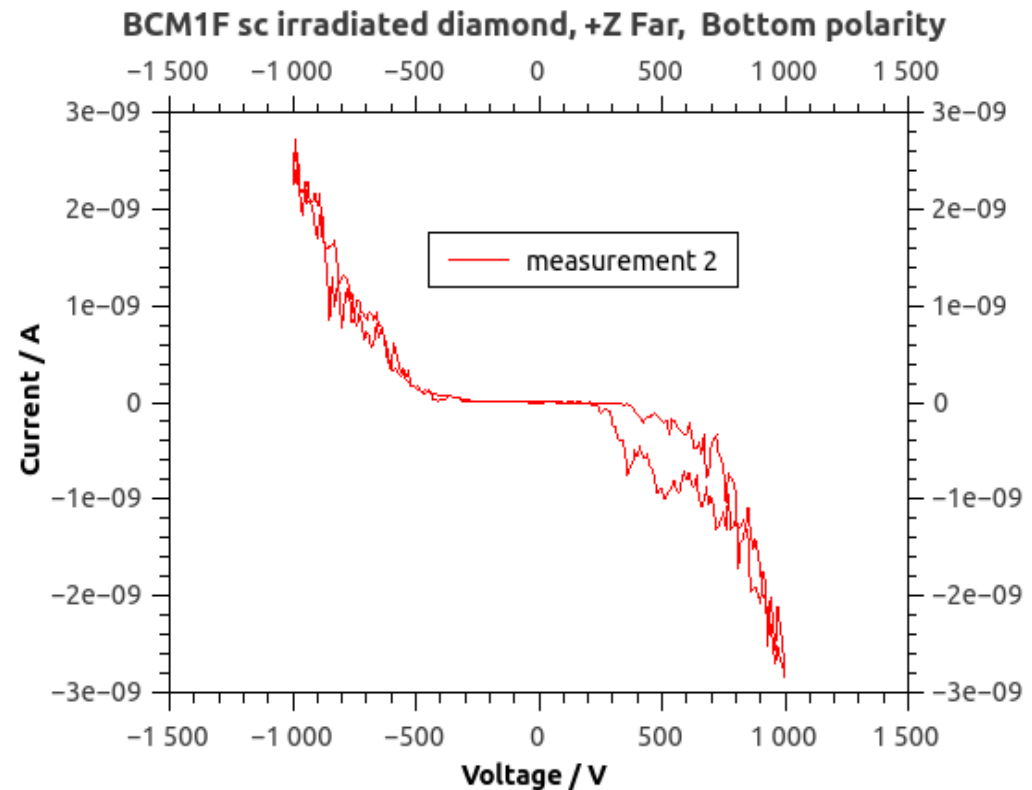
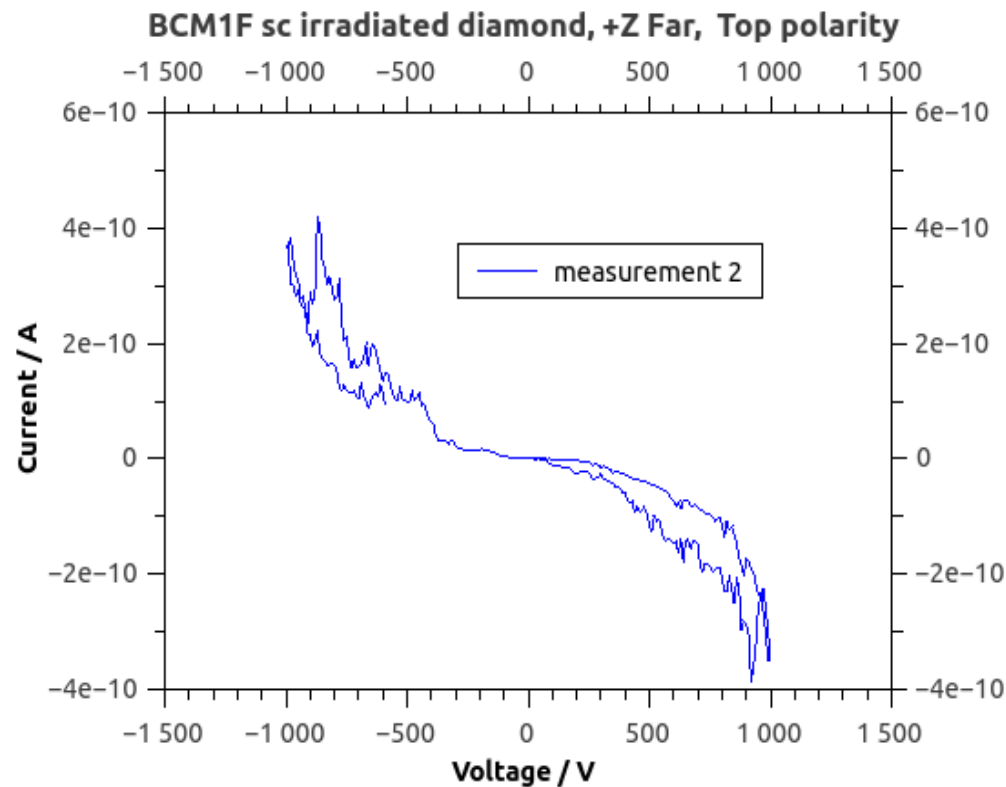
first measurements



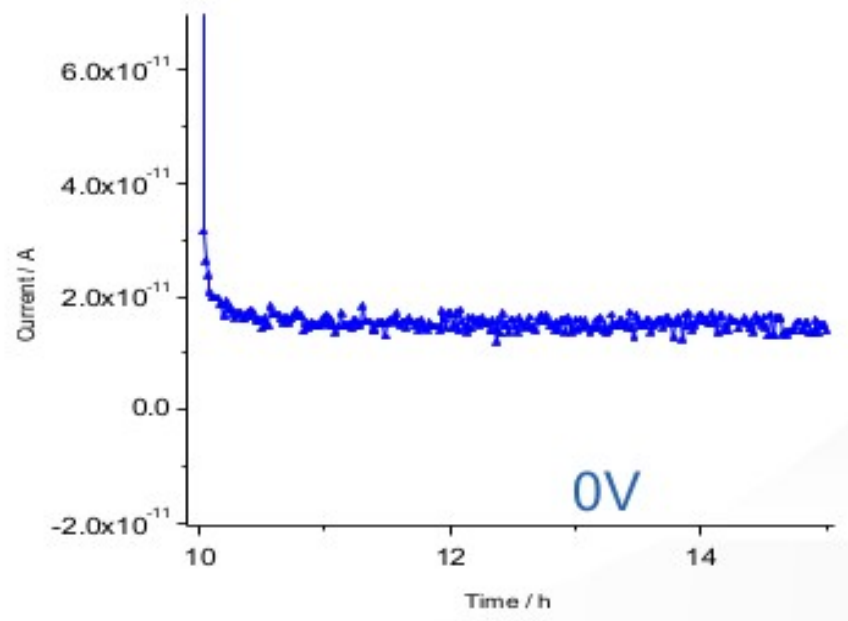
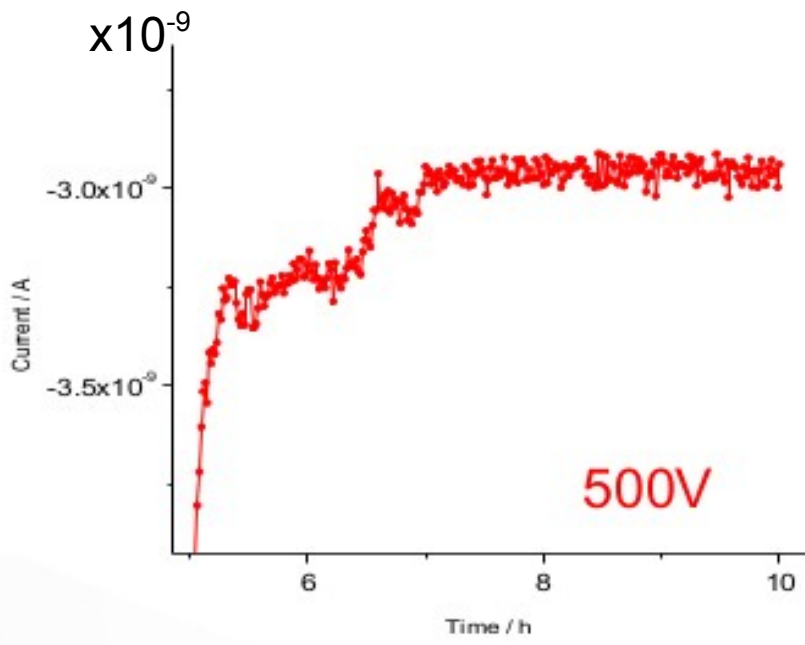
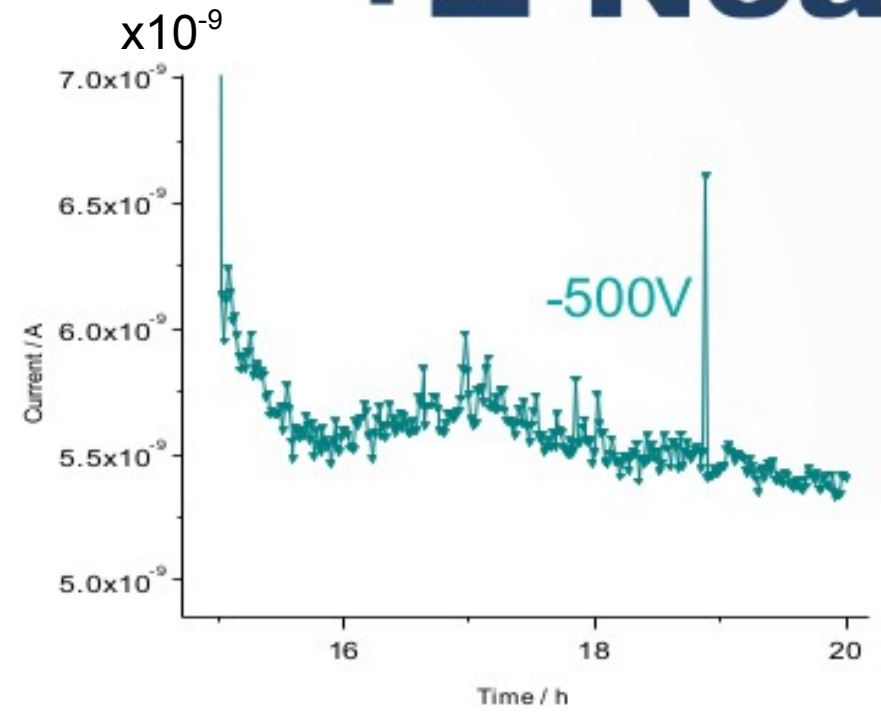
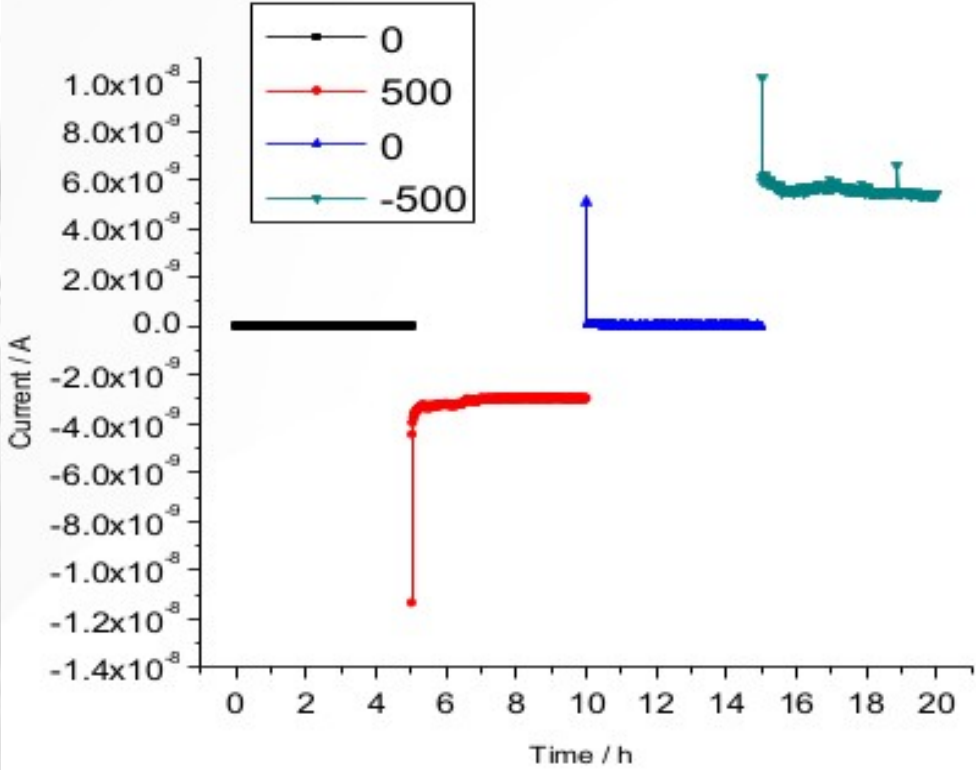
IV characterisation +Z Far diamond

current for measurements with source for -500V is $6 \times 10^{-9} \text{A}$, for 500V it is $-3.5 \times 10^{-9} \text{A}$. → for measurement w/o source it should be less.

Second measurement. Why order of current is different?



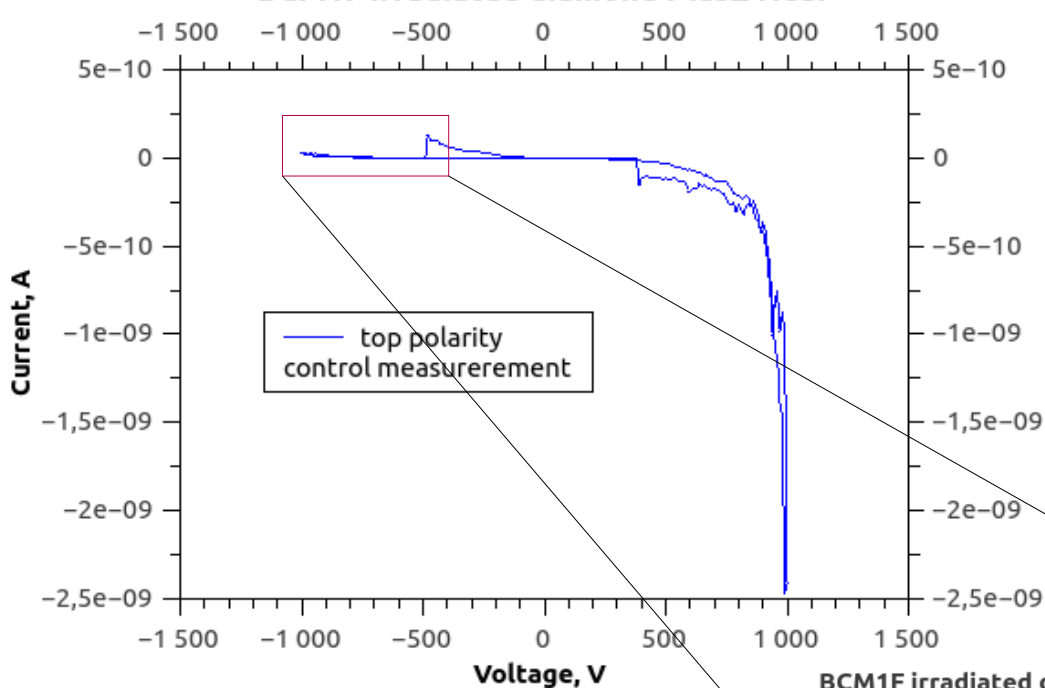
* +Z Near



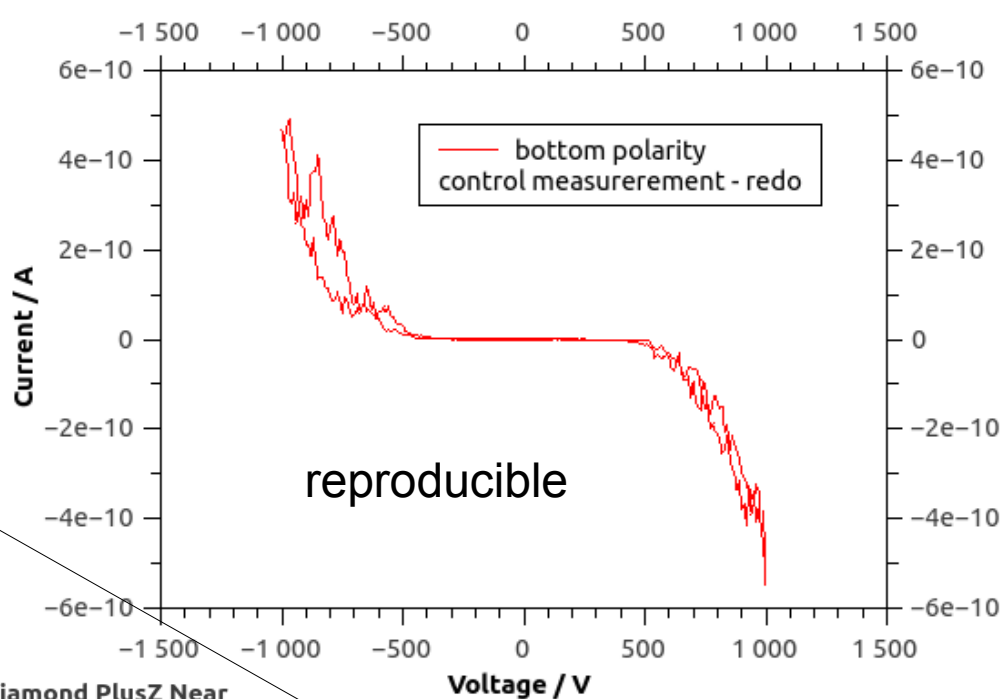
IV characterisation +Z Near diamond (meas.1)

current for measurements with source for -500V is $5.5 \times 10^{-9} \text{A}$,
for 500V it is $-3 \times 10^{-9} \text{A}$.

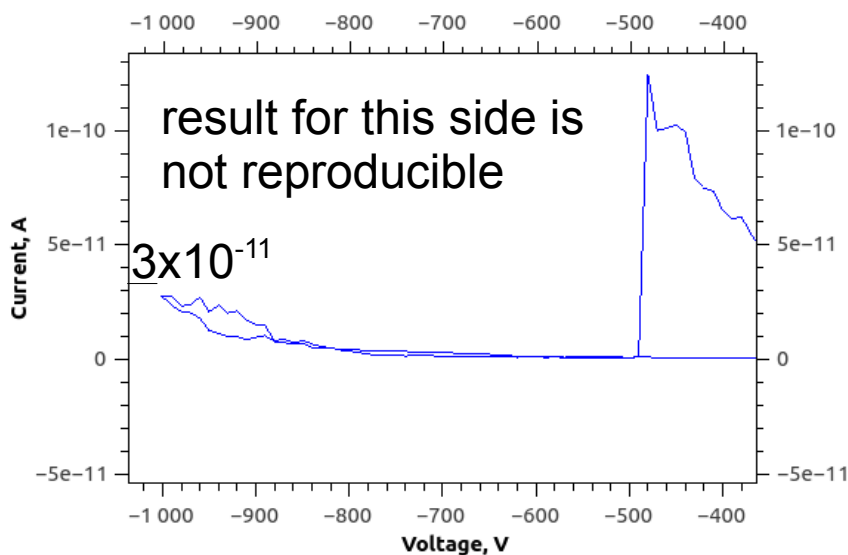
BCM1F irradiated diamond PlusZ Near



BCM1F irradiated diamond PlusZ Near

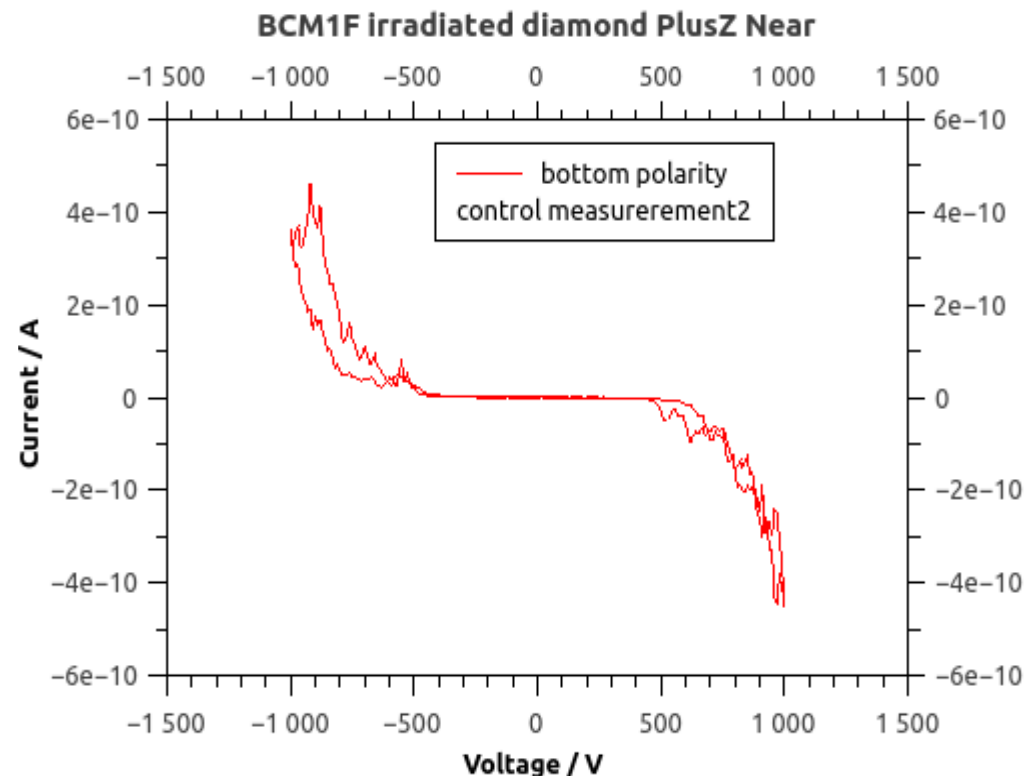
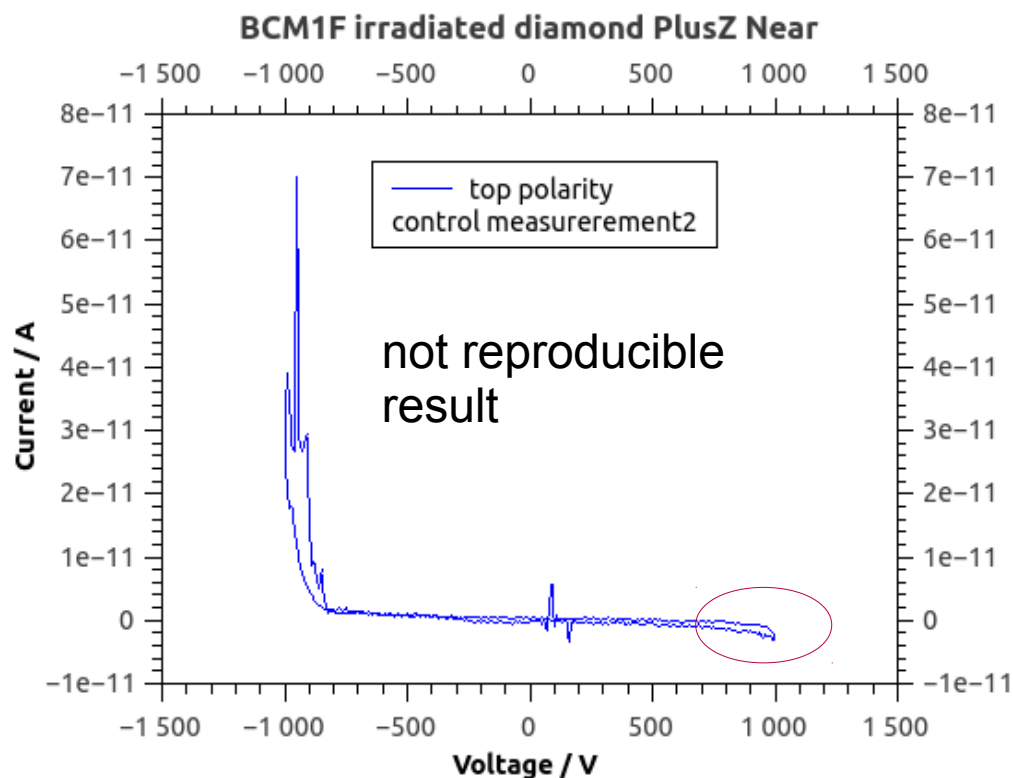


BCM1F irradiated diamond PlusZ Near

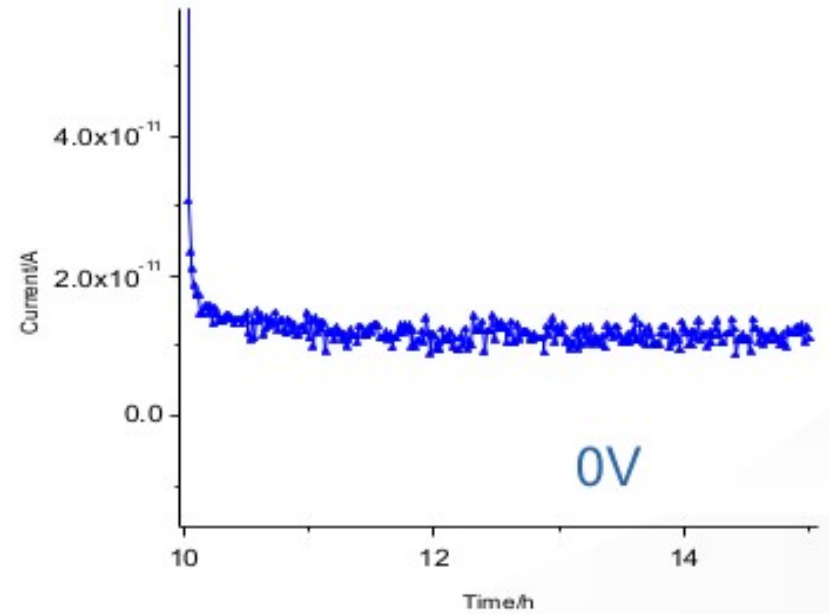
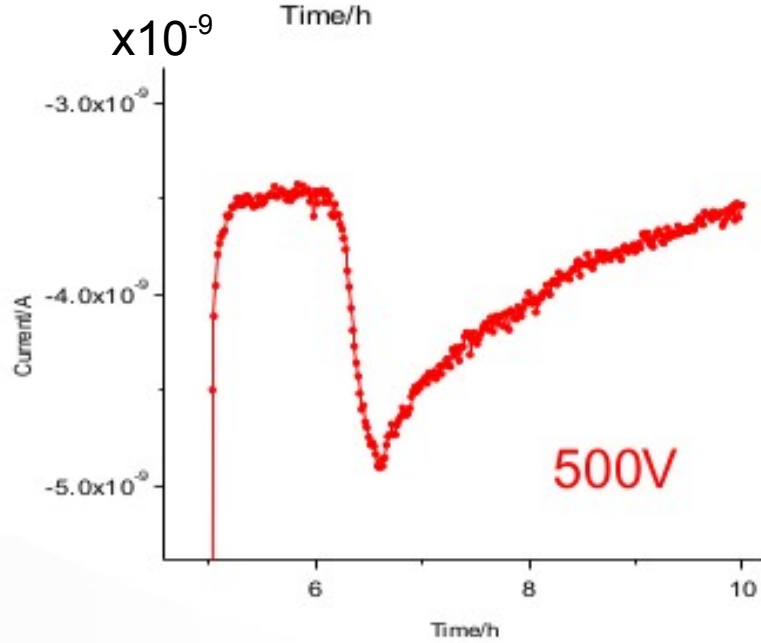
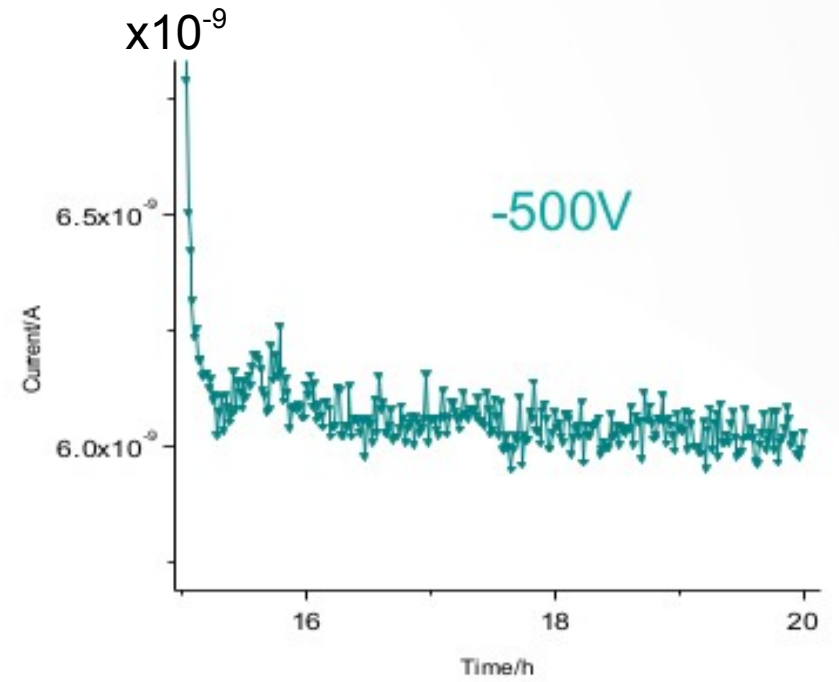
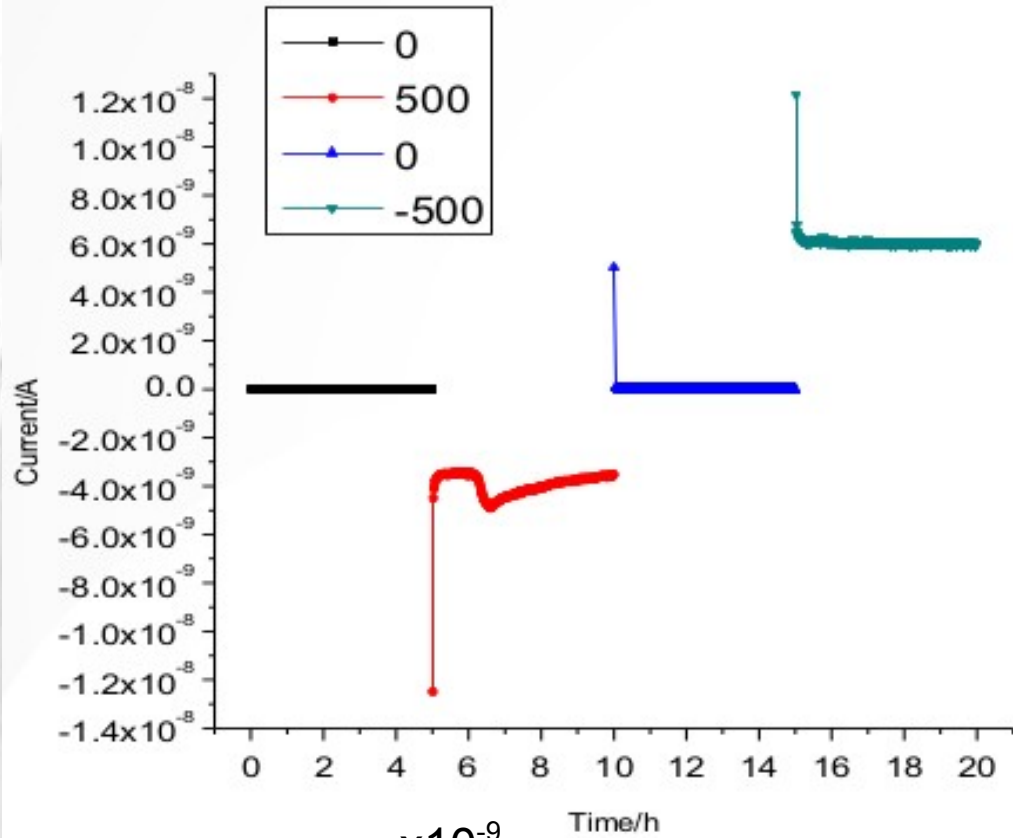


IV characterisation +Z Near diamond (meas.1)

current for measurements with source for -500V is $5.5 \times 10^{-9} \text{A}$,
for 500V it is $-3 \times 10^{-9} \text{A}$.



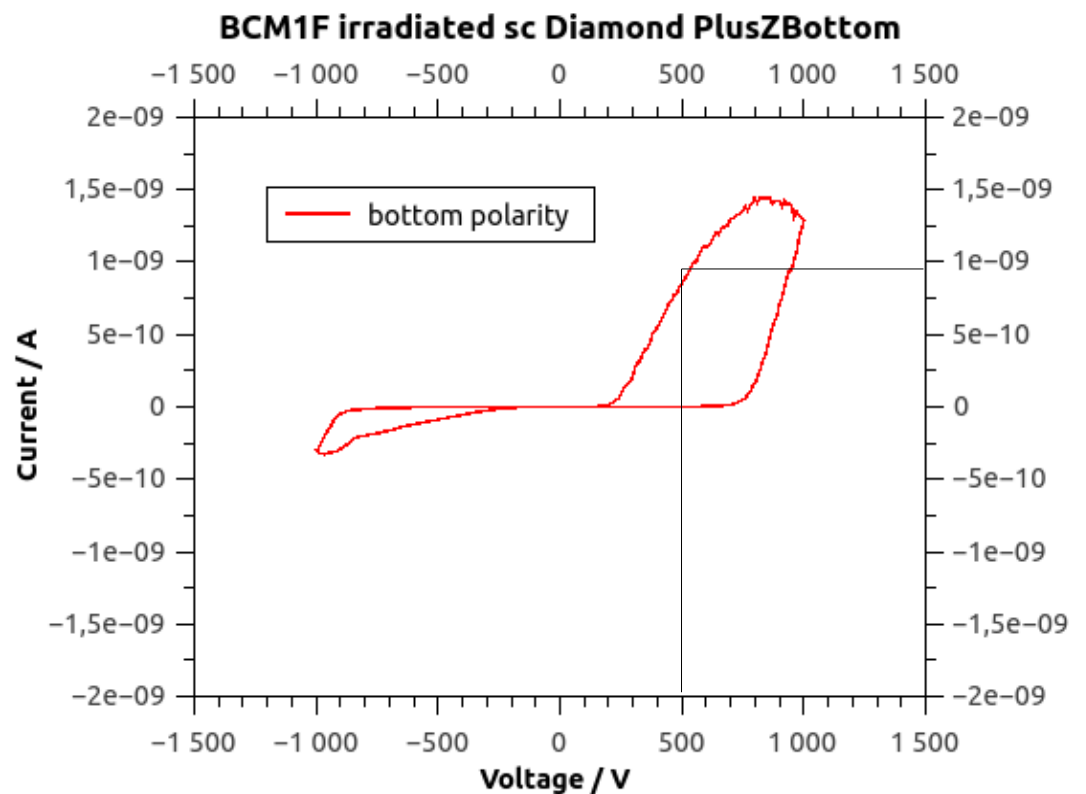
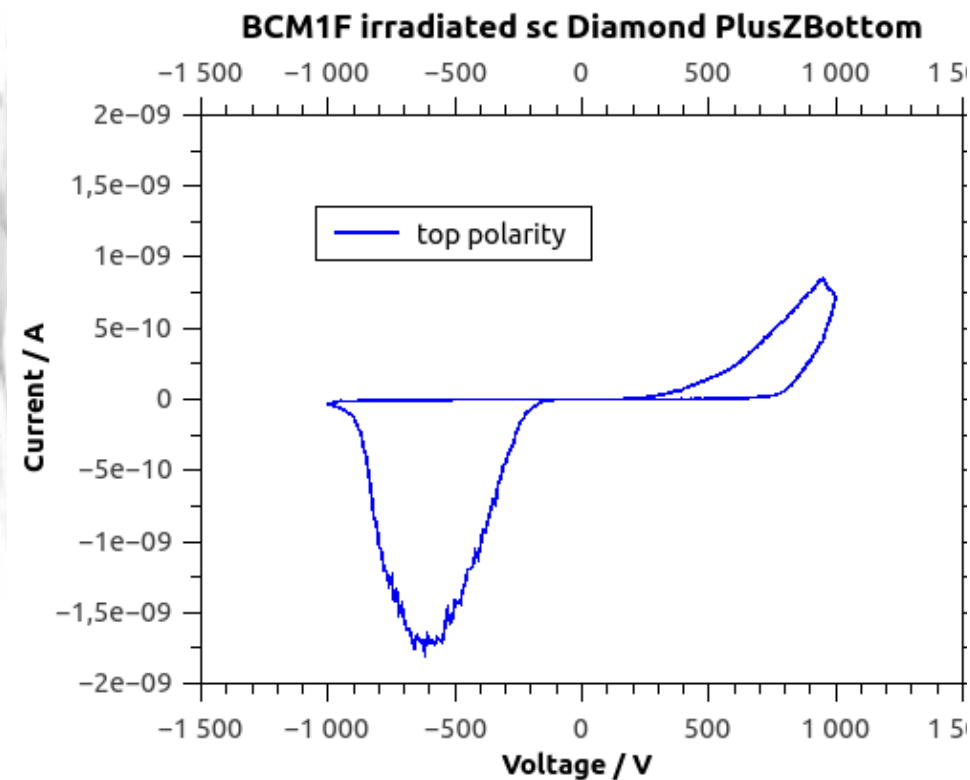
* +Z Bottom



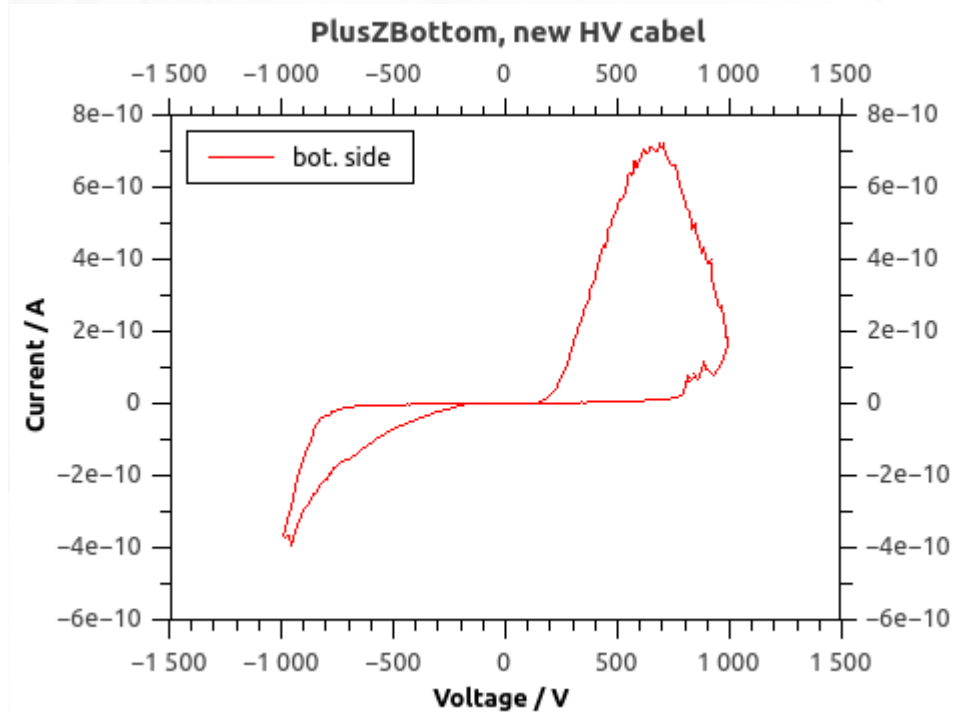
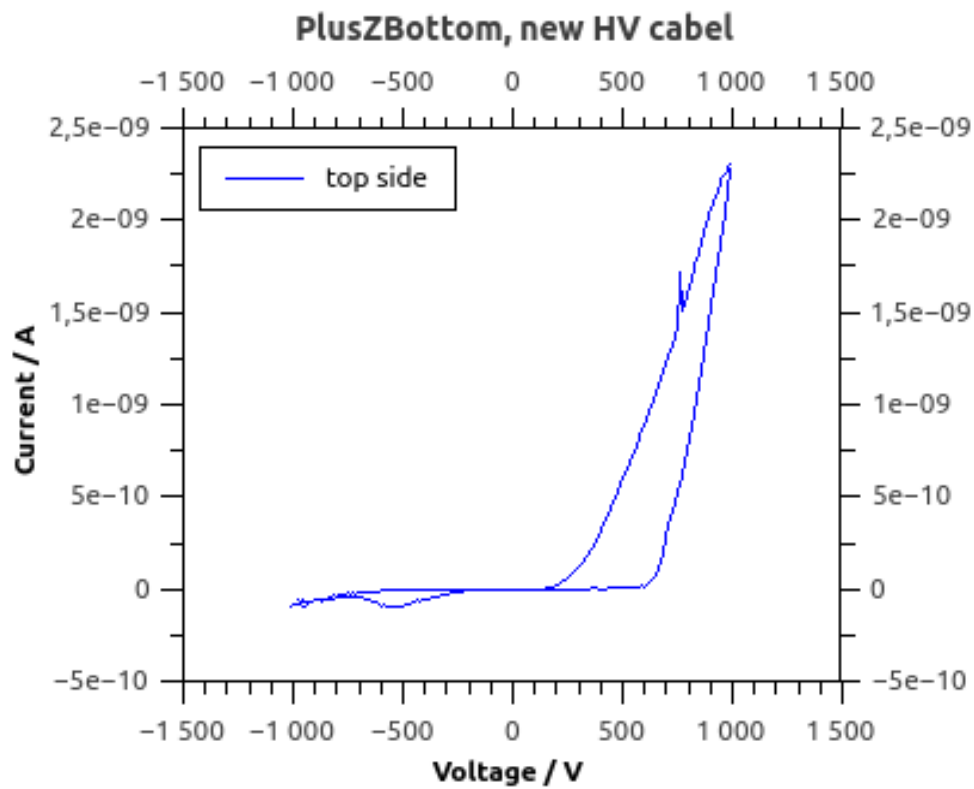
IV characterisation +Z Bottom diamond

current for measurements with source for -500V is 6×10^{-9} A,
for 500V it is $-3.5-5 \times 10^{-9}$ A.

for this diamond measurement is reproducible and value of the current are close to each other

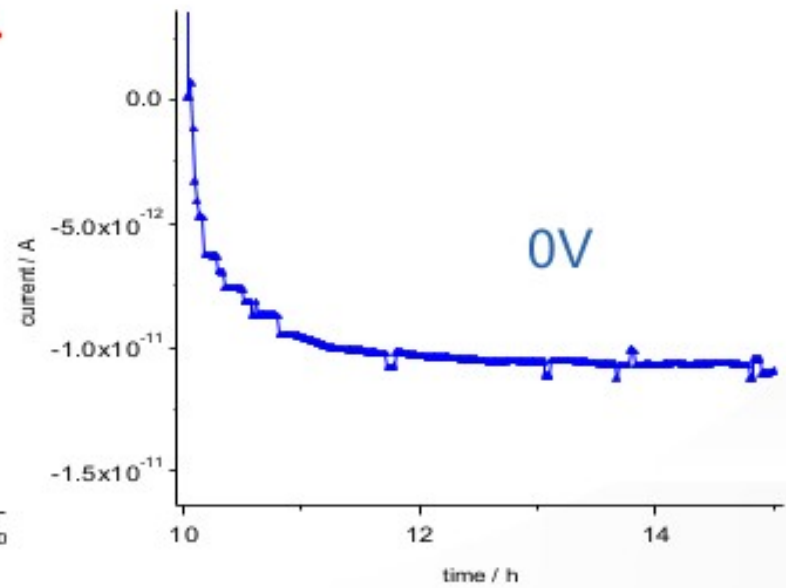
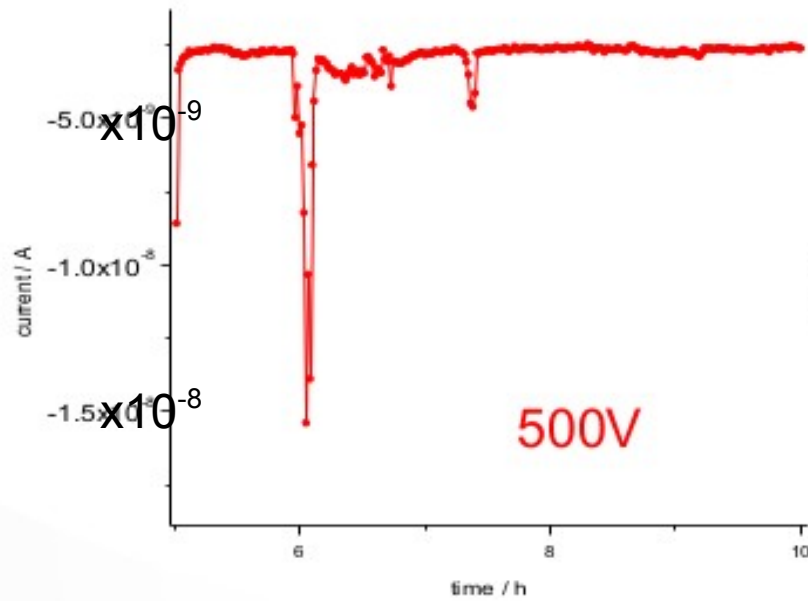
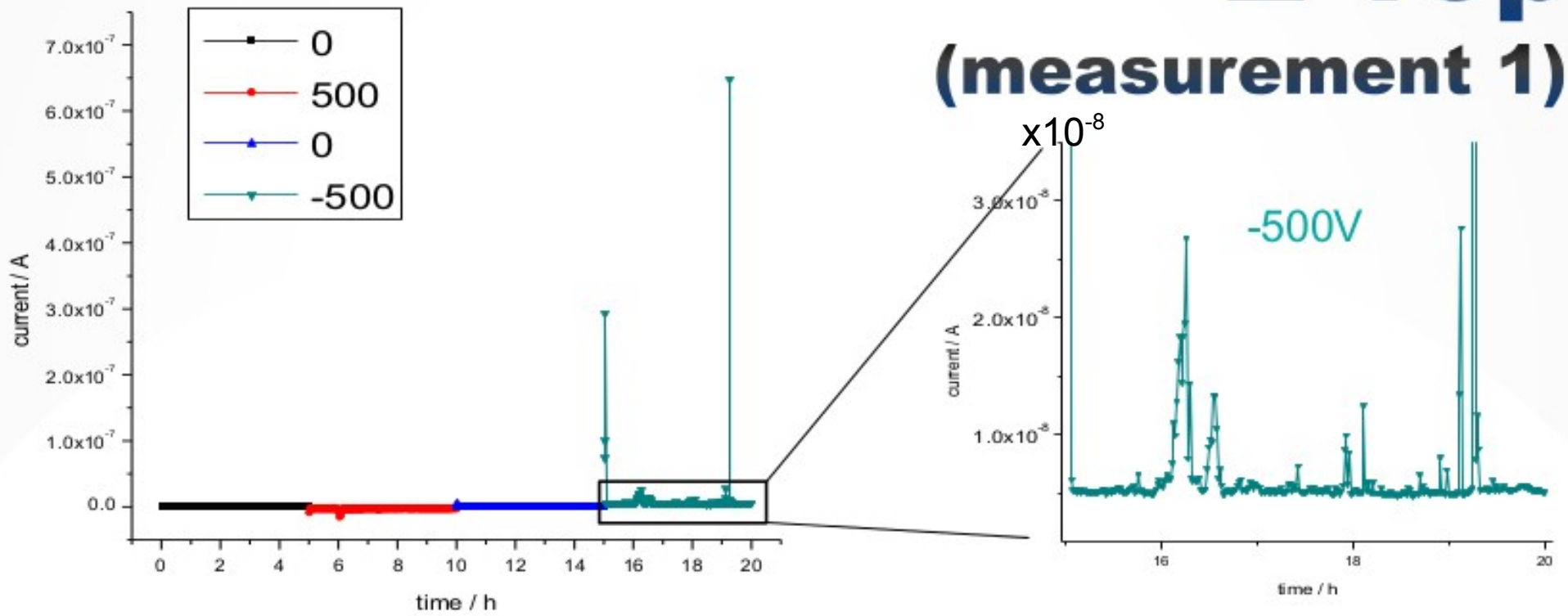


IV characterisation +Z Bottom diamond new cabel for HV



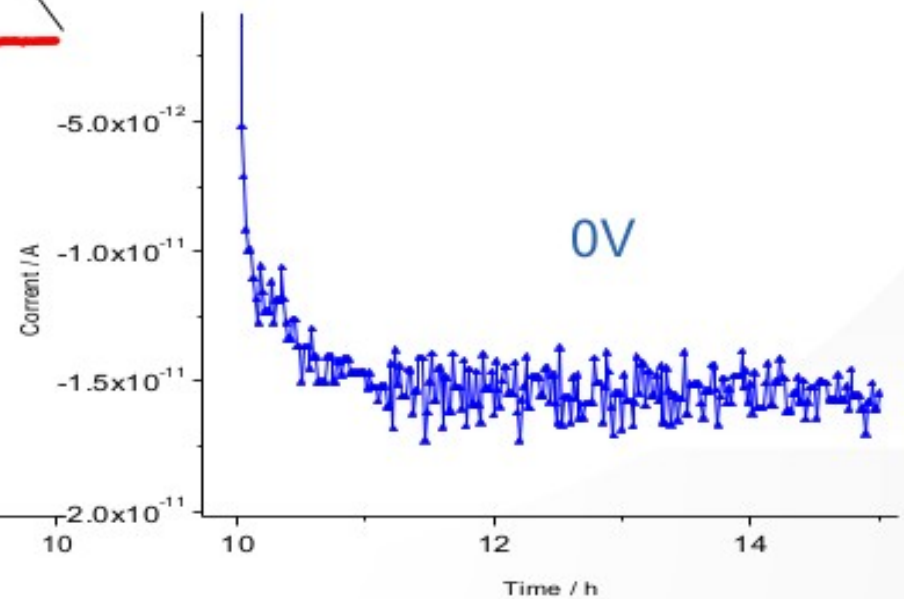
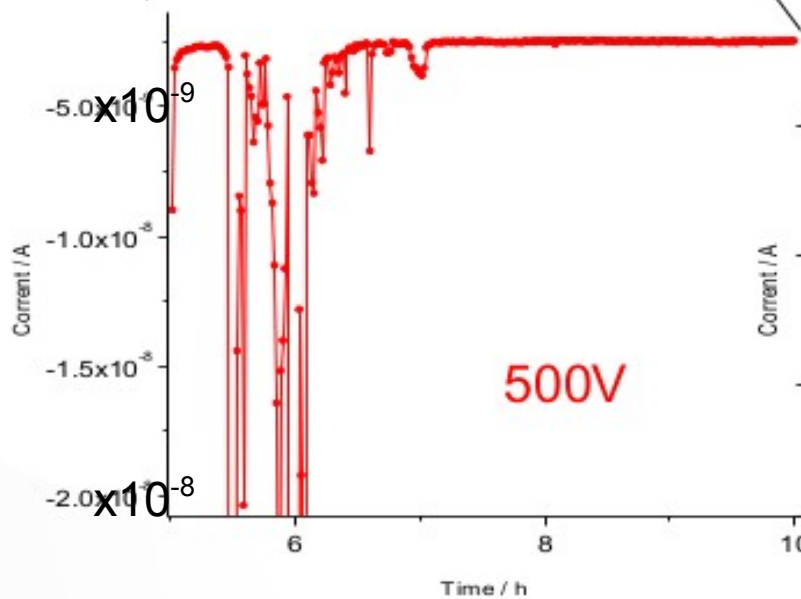
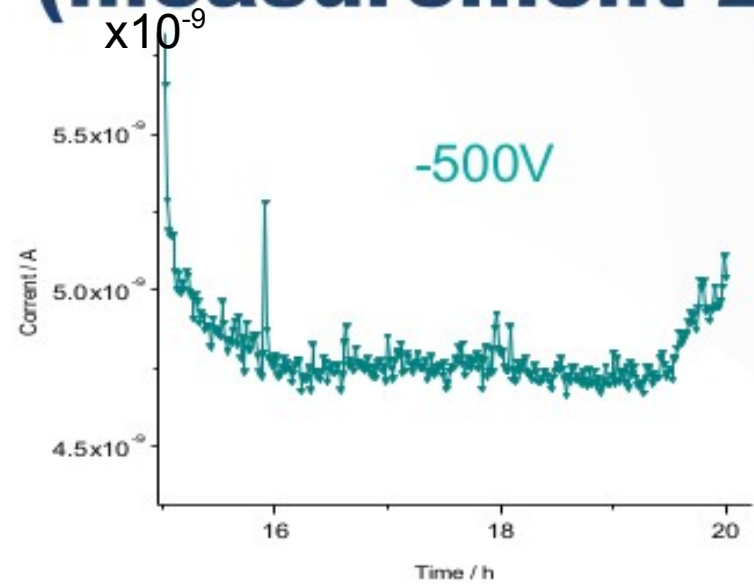
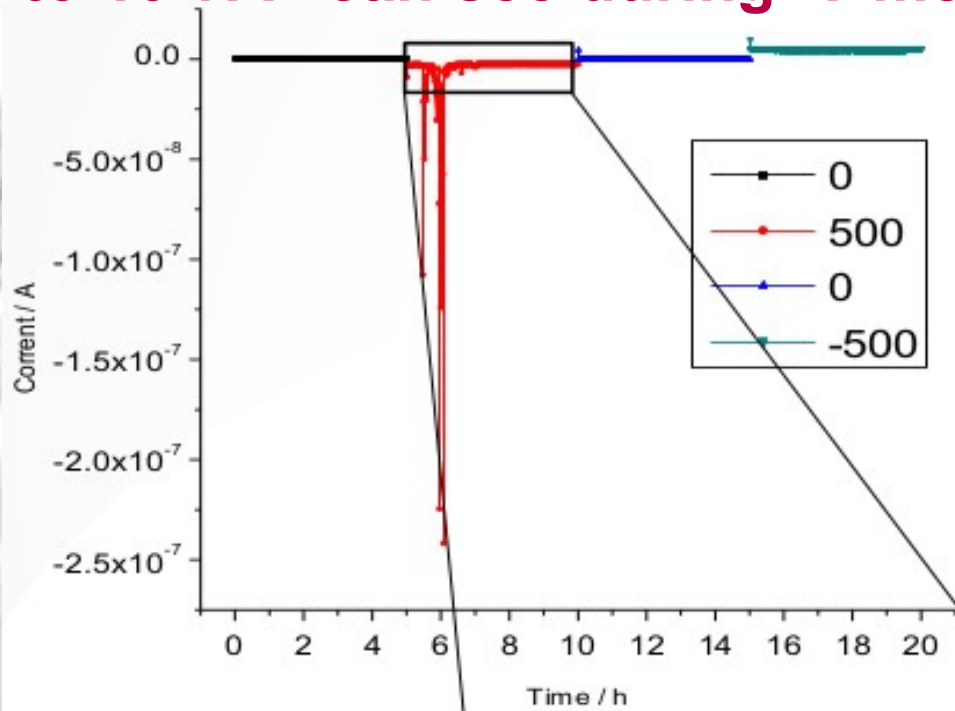
* -Z Top

(measurement 1)



The same behavior - peaks in current to 10⁻⁷A I can see during IV measurements.

* **-Z Top**
(measurement 2)



Questions we need to answer

- Why for current over time (0V → 500V → 0V → -500V) current value is -3.5×10^{-9} for 500V and 6×10^{-9} for -500V?
- Why IV measurements for +ZFar are not reproducible?
- What dependence we can see for +ZBottom? IV, current over time and 48h current at 500V measurements.
- If current for frame only in value of few nA what we really measure with a diamond?
- What is the plan for -Ztop?