Universität Siegen ARIES update

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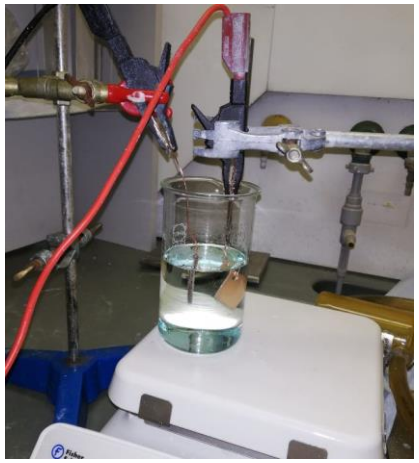
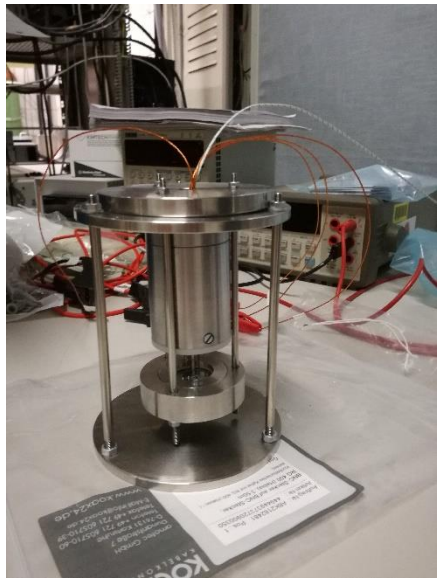
What's been going on?

- **Surface treatment**
  - Initial tests conducted using SUBU. Great feedback and assistance from Eduard – Good results so far.
  - Initial tests conducted using EP.
    - Standard mixture (3:2 H_3PO_4:Butanol) used. Great feedback and assistance from Eduard.
  - Bachelors student completing study of a combination of surface treatment techniques
  - Masters student completing study into optimization of EP process. Includes the use of Hydroxyl ion additives such as starch.

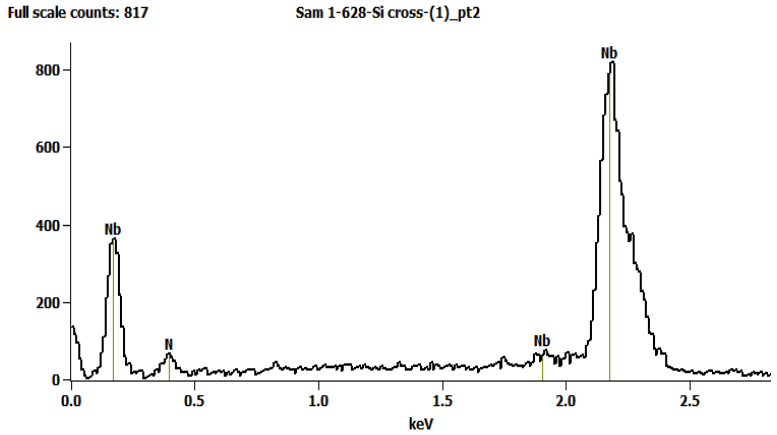
- Electrical resistance measurement device constructed (Non-superconducting temperatures)
  - Testing underway

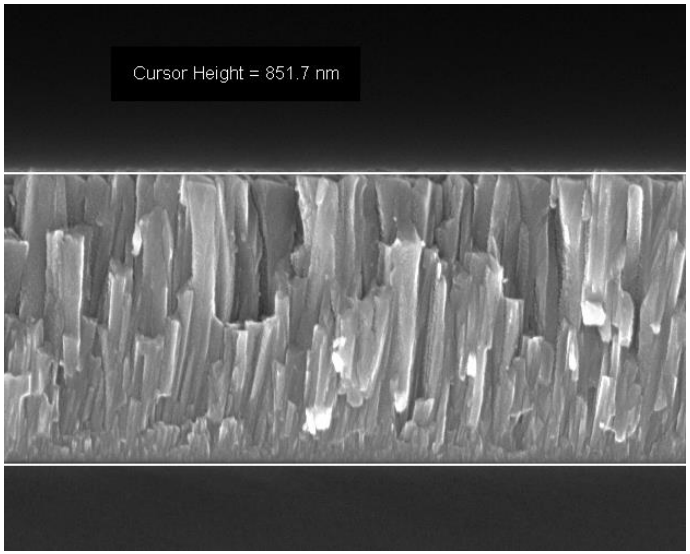




What's been going on?

- **Film deposition**
  - NbN deposition on Cu and Si - 2^3 factorial study.
    - Temperature, Bias Voltage and N_2%. Characterization tbc by Masters student
  - Nb and NbN deposited on Si – 8 samples prepared for electrical resistivity measurements.
  - NbN pre-screening samples to test machine settings.
    - 5 samples ready for further superconductivity tests (N2% changed based on prior feedback from Eugen)
    - Initial poisoning of target visible in voltage curve. Stable after 2-3 minutes. Substrate turned away during initiation.
  - NbN partial factorial screening study (2^{6-1}) – 36 samples. Currently underway.
    - Temperature, Pressure, Bias, N_2%, Cathode power, Gas type (Ar/Kr)
- Coating of QPR Sample – Coating Machine setup ready





Future Work

- Completion of NbN screening study (DC MS)
  - Followed by optimisation study based on results
  - Superconductivity tests of samples. Best to be chosen.
- Optimised surface treatment method based on students results
- Study of effects of surface treatment method with optimised deposition parameters
  - Final optimised DC MS NbN samples.
- Coating of QPR sample to be completed
- Initiation of HiPIMS experiments with NbN
  - Screening factorial study with HiPIMS parameters
  - Secondment to CemeCon to speed up process
  - Optimised samples by year end