14th IFAST WP9 meeting

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“All Quiet at Uni Siegen”

1. Deposition studies:

   - **NbTiN** in CC800: DCMS and HiPIMS

   - Nb_3Sn in BoxCoater: RFMS, “test” the material, SIS structures

   - **MgB_2** in PVD/SEY chamber: co-sputtering with RFMS

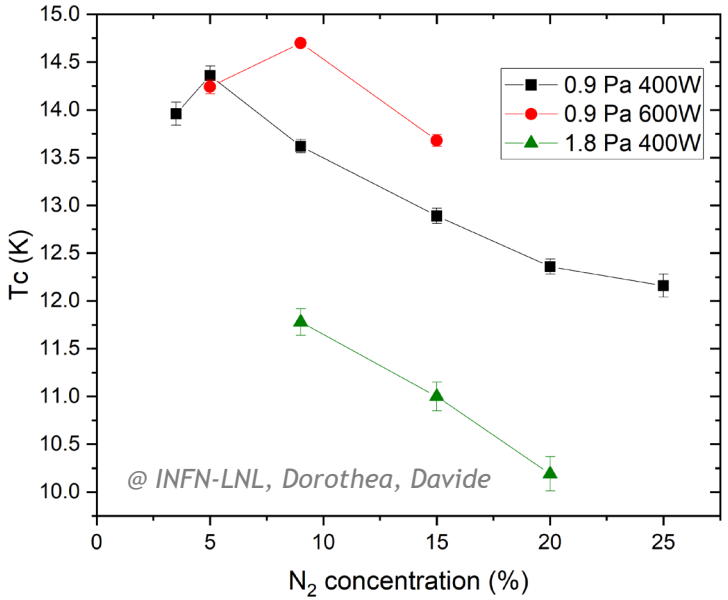
   on metal (Cu, Nb…) as well as insulating (AlN, TiO_2, Al_2O_3) substrates

2. Substrate preparation:

3. Sample characterization:

Results: SEM Micrographs (HiPIMS-NbTiN)

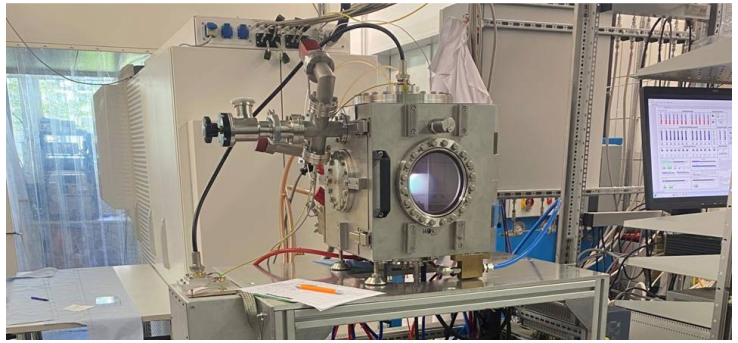
	Power (W)	Pressure(Pa)	N_2%	S.B (V)	S.T (℃)	Tc (K)
NbTiN_DC_030	400	0.9	5	50	250	**14.36**
NbTiN_DC_024	400	0.9	9	150	250	**14.85**
NbTiN_DC_042	600	0.9	9	50	250	**14.70**
NbTiN_DC_051	400	0.5	9	50	250	**14.42**
NbTiN_DC_076	400	0.5	5	50	250	**13.8**
NbTiN_DC_077	600	0.5	9	50	250	**14.6**

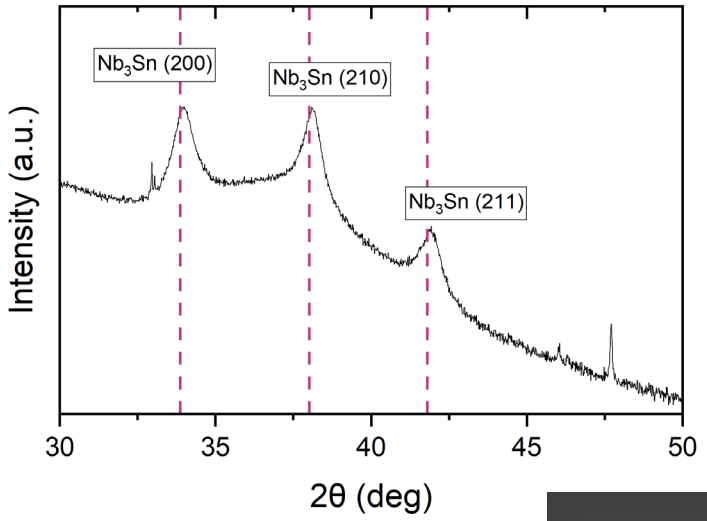


	Power (W)	Pressure(Pa)	N_2%	S.B (V)	S.T (℃)	P. F (Hz)	P. W (μs)	DCy (%)	Tc (K)
NbTiN_HP_027	400	1.6	5	50	150	1000	200	20	**14.80**
NbTiN_HP_016	400	1.3	9	50	150	1000	200	20	**14.03**
NbTiN_HP_028	400	1.6	9	50	150	1000	100	10	**14.23**
NbTiN_HP_045	400	1.3	9	75	150	1000	100	10	**14.51**

Nb_3Sn RF sputtering

Nb_3Sn in **BoxCoater**



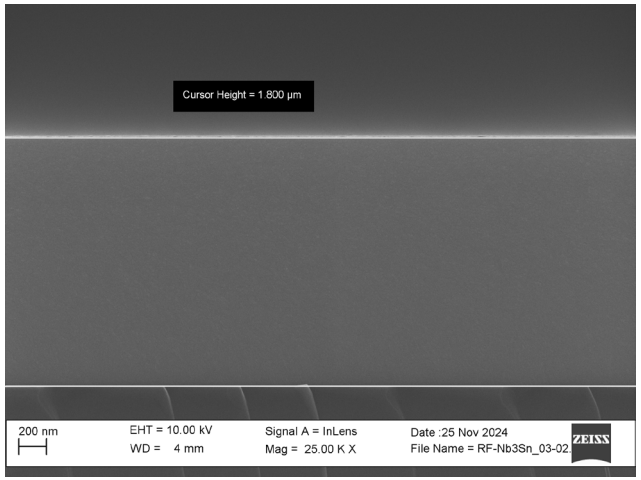


Test depositions for multilayer systems
Later process transfer to CC800 – HiPIMS

NbSn_07: p = 0.6 Pa, P =100W → a = 5.288(1) Å

NbSn_09: p = 1 Pa, P = 150W → a = 5.285(2) Å

EDX: 86% Nb and 14% Sn !



Plans and outlook

- Results of T_c for **HiPIMS-NbTiN**: Tc is limited as well
- Deposition of multilayer (SS or SIS) structures with

  DC-NbTiN (“best” conditions) / DC-AlN/ **HiPIMS-Nb** or **bulk Nb**
- Start of **MgB_2** deposition in PVD/SEY deposition chamber by RF co-sputtering: **promising**
- Deposition of **Nb_3Sn** in BoxCoater: optimization of deposition conditions
- QPR samples for RF test and surface resistance

THANK YOU FOR YOUR ATTENTION!