



Institute of Electrical Engineering SAS

Eugen SEILER, Rastislav RIES

# **SC characterization at IEE Bratislava**

# OVERVIEW

## Sample Batches characterised:

NbN films (on Cu) – prepared at Siegen Uni

- study of N<sub>2</sub> content in the depos. atmosphere
- study of deposition pressure

Multilayer films Nb/AlN/(NbTiN or NbN), different subst. – prepared at STFC

From 4.11. measurements interrupted – technical problems

now resolved, set-up running again

Measurements expected to resume in early 2020

**Laser-treated** samples (L16,L20) – *article in preparation* (R. Ries – PhD stud. at IEE Bratislava)

Comparing SC performance ( $B_{en}$ ) and surface characteristics/quality (AFM, SEM done at IEE) after irradiation at different photon doses.

- plan to circulate the manuscript sometime in January

# Multilayer samples - Summary

Multilayers [of Nb|Nb-Ti|AlN|NbTiN] from STFC – batch 14.Oct2019, in  
**PARALLEL** applied field

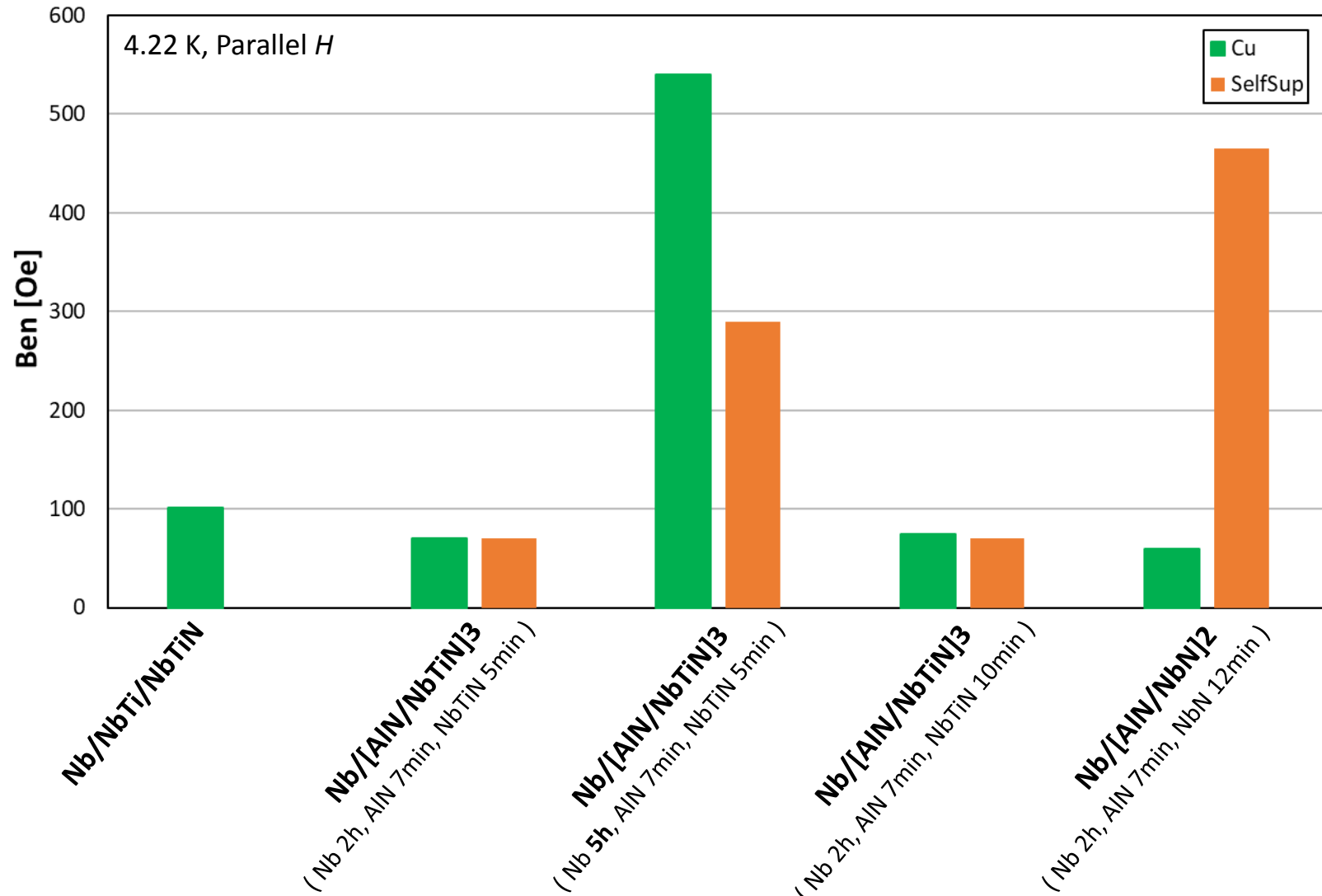
	sample:	Ben [Oe]		Note:
		perp.	Parallel	
<b>ML</b>	Nb/NbTi/NbTiN_14_08_19_Cu		101	
	Nb/NbTi/NbTiN_14_08_19_Sapp	unable to center		
	Nb/NbTi/NbTiN_14_08_19_Ta			
SS - Self-supported film	Nb/(AlN/NbTiN) <sub>3</sub> _16_08_19_Cu		70	
	Nb/(AlN/NbTiN) <sub>3</sub> _16_08_19_Sapp	missing		
	Nb/(AlN/NbTiN) <sub>3</sub> _16_08_19_Ta			
	Nb/(AlN/NbTiN) <sub>3</sub> _16_08_19_SS		70	
STFC Daresbury 15.10.2019 series	Nb/(AlN/NbTiN) <sub>3</sub> _19_08_19_Cu		540	
	Nb/(AlN/NbTiN) <sub>3</sub> _19_08_19_Sapp		67	
	Nb/(AlN/NbTiN) <sub>3</sub> _19_08_19_Ta			
	Nb/(AlN/NbTiN) <sub>3</sub> _19_08_19_SS		290	
	Nb/(AlN/NbTiN) <sub>3</sub> _21_08_19_Cu		75	
	Nb/(AlN/NbTiN) <sub>3</sub> _21_08_19_Sapp		45	
	Nb/(AlN/NbTiN) <sub>3</sub> _21_08_19_Ta			
	Nb/(AlN/NbTiN) <sub>3</sub> _21_08_19_SS		70	
	Nb/(AlN/NbN) <sub>2</sub> _30_08_19_Cu		60	
	Nb/(AlN/NbN) <sub>2</sub> _30_08_19_Sapp		180-250	
Nb/(AlN/NbN) <sub>2</sub> _30_08_19_Ta				
Nb/(AlN/NbN) <sub>2</sub> _30_08_19_SS		465		
	HIPIMs_Oct_19_Nb_foil		700	

all @ 4.2 K

- Nb & Nb<sub>3</sub>Sn samples: Ben ~ 400 – 1000 Oe

# Multilayer samples - Summary

Results on *Cu* substrate and *Self-supported* films (peeled off of Si or vitreous Carbon)

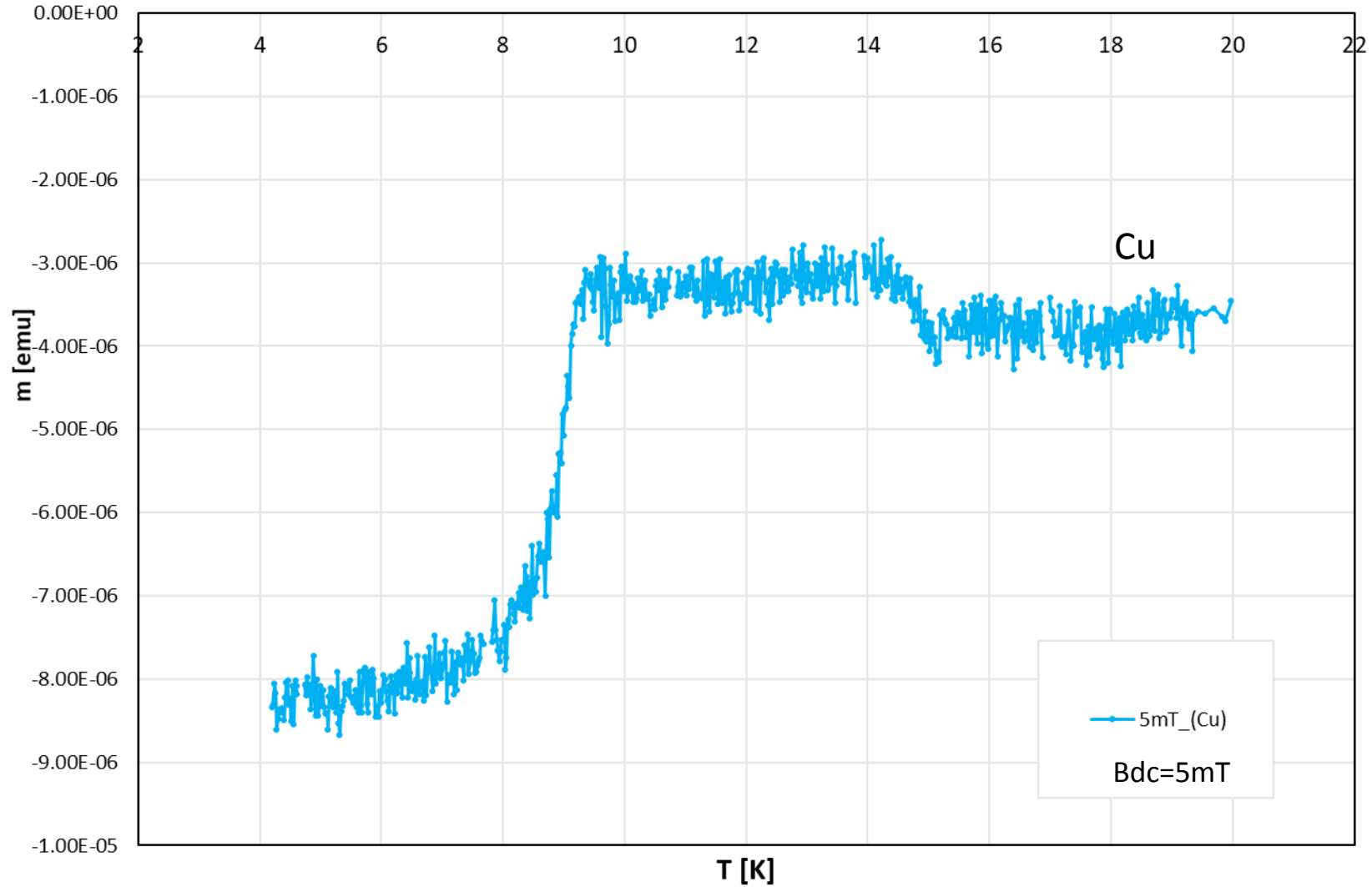


# Multilayer samples - Details

(can be skipped)

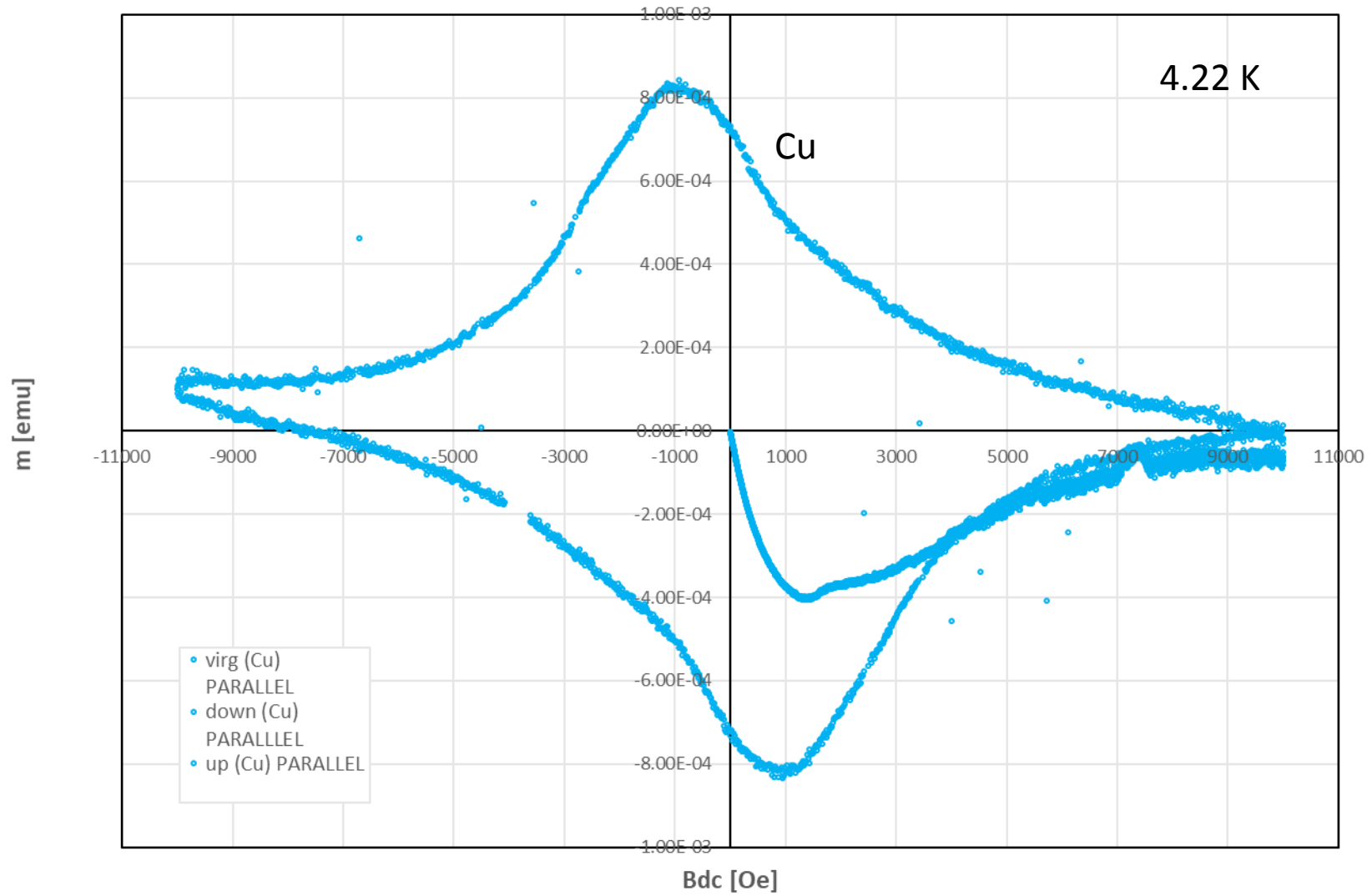
14/08/19 – Nb/NbTi/NbTiN

Cu, Ta, Sapphire subst.



# 14/08/19 – Nb/NbTi/NbTiN

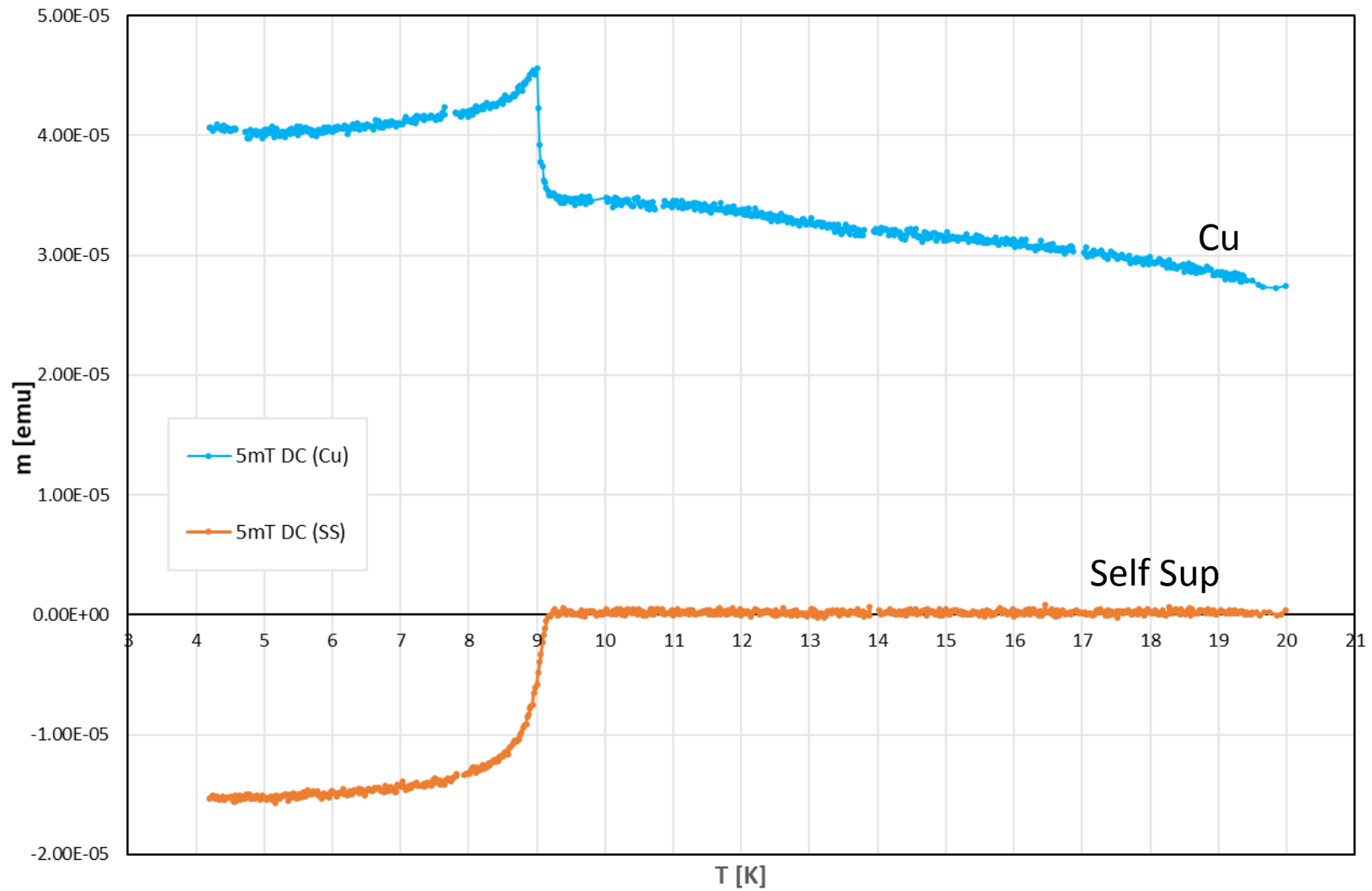
Cu, Ta, Sapphire subst.



16/08/19 – Nb/[AlN/NbTiN]3

( Nb 2h, AlN 7min, NbTiN 5min )

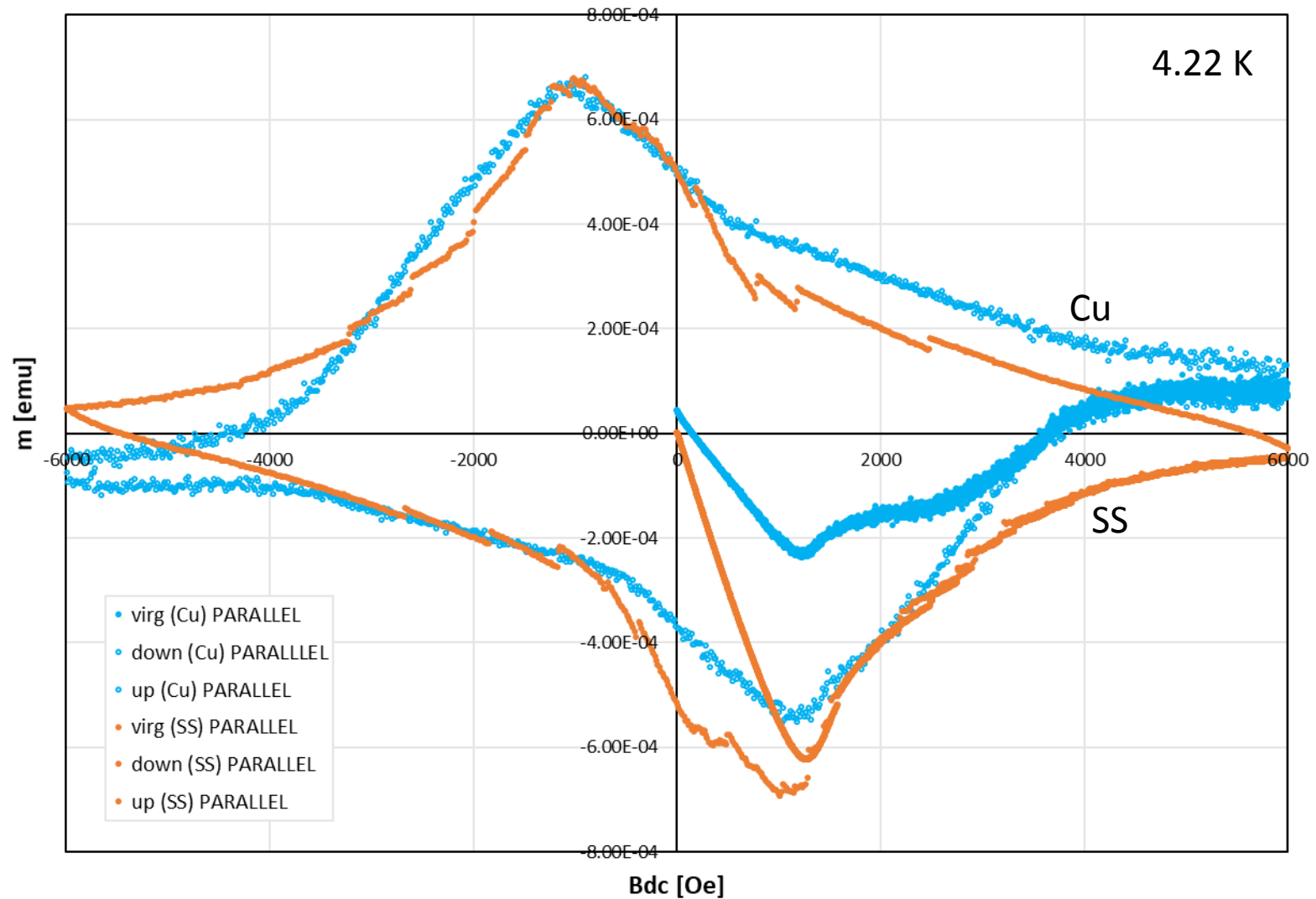
Cu, Ta, subst.



16/08/19 – Nb/[AlN/NbTiN]3

( Nb 2h, AlN 7min, NbTiN 5min )

Cu, Ta, subst.

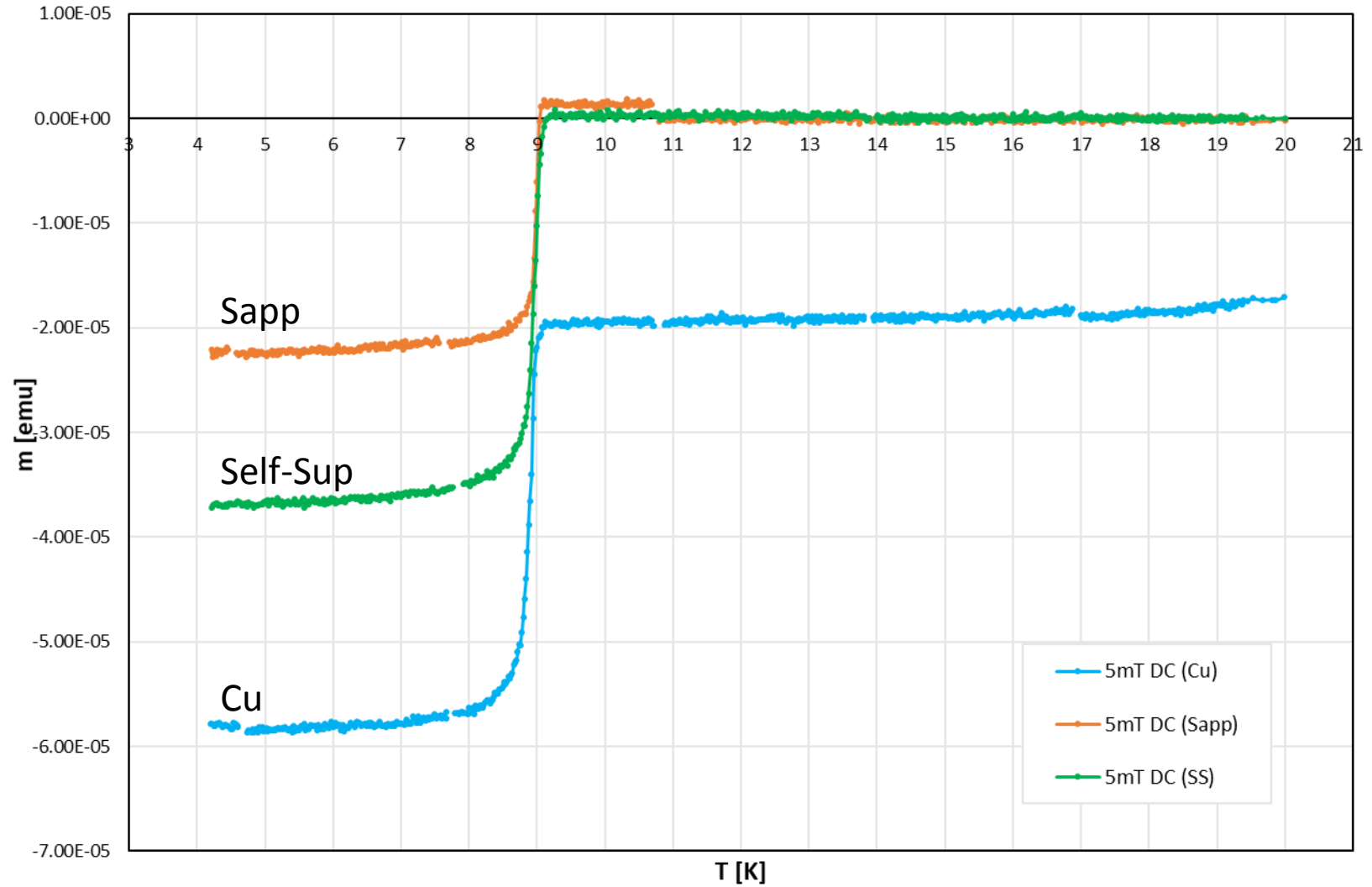




19/08/19 – Nb/[AlN/NbTiN]3

( Nb 5h, AlN 7min, NbTiN 5min )

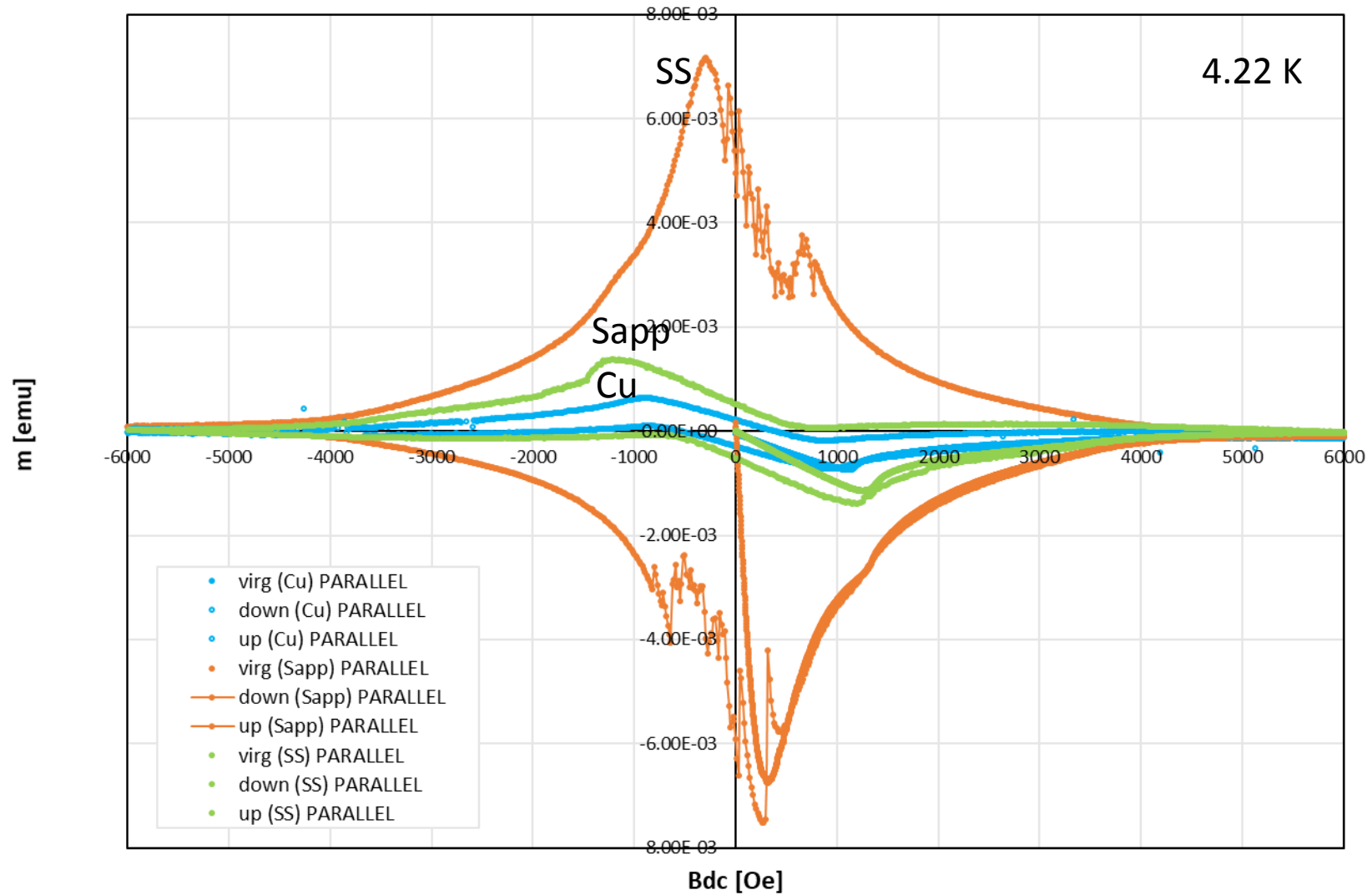
Cu, Ta, Sapphire subst., Self-Supported film (SS)



19/08/19 – Nb/[AlN/NbTiN]3

( Nb 5h, AlN 7min, NbTiN 5min )

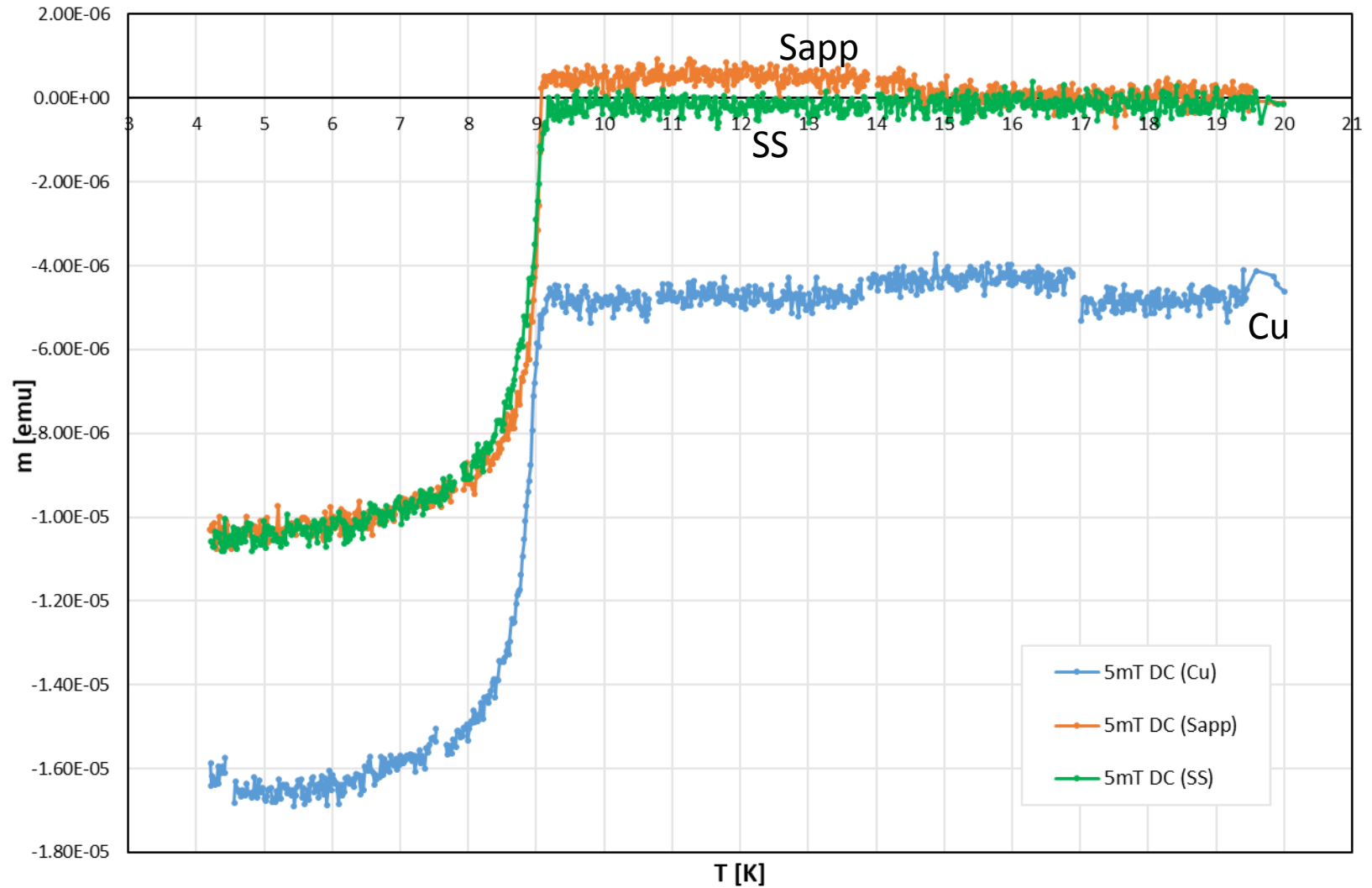
Cu, Ta, Sapphire subst., Self-Supported film (SS)



21/08/19 – Nb/[AlN/NbTiN]3

( Nb 2h, AlN 7min, NbTiN 10min )

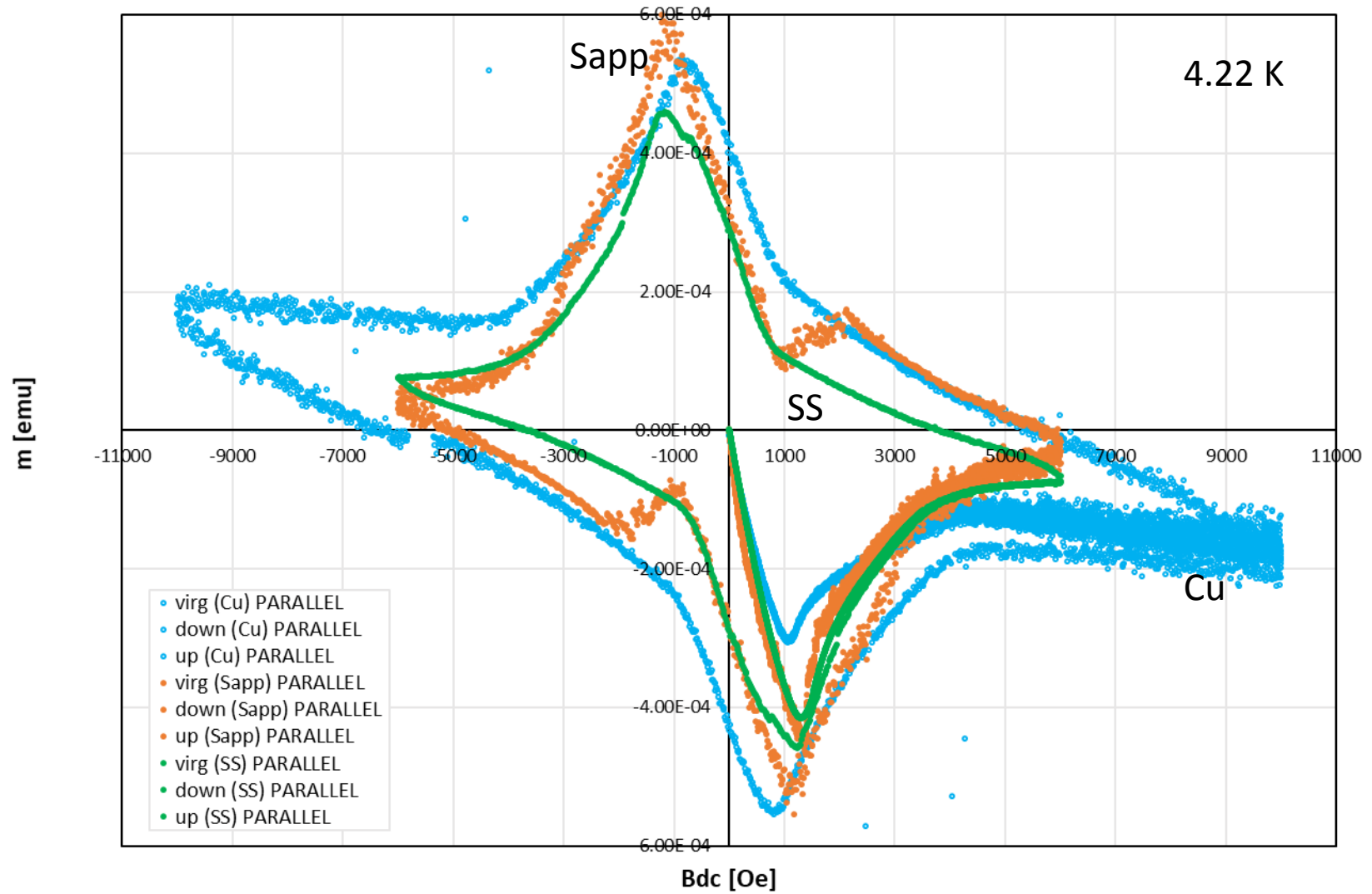
Cu, Ta, Sapphire subst., Self-Supported film (SS)



21/08/19 – Nb/[AlN/NbTiN]3

( Nb 2h, AlN 7min, NbTiN 10min )

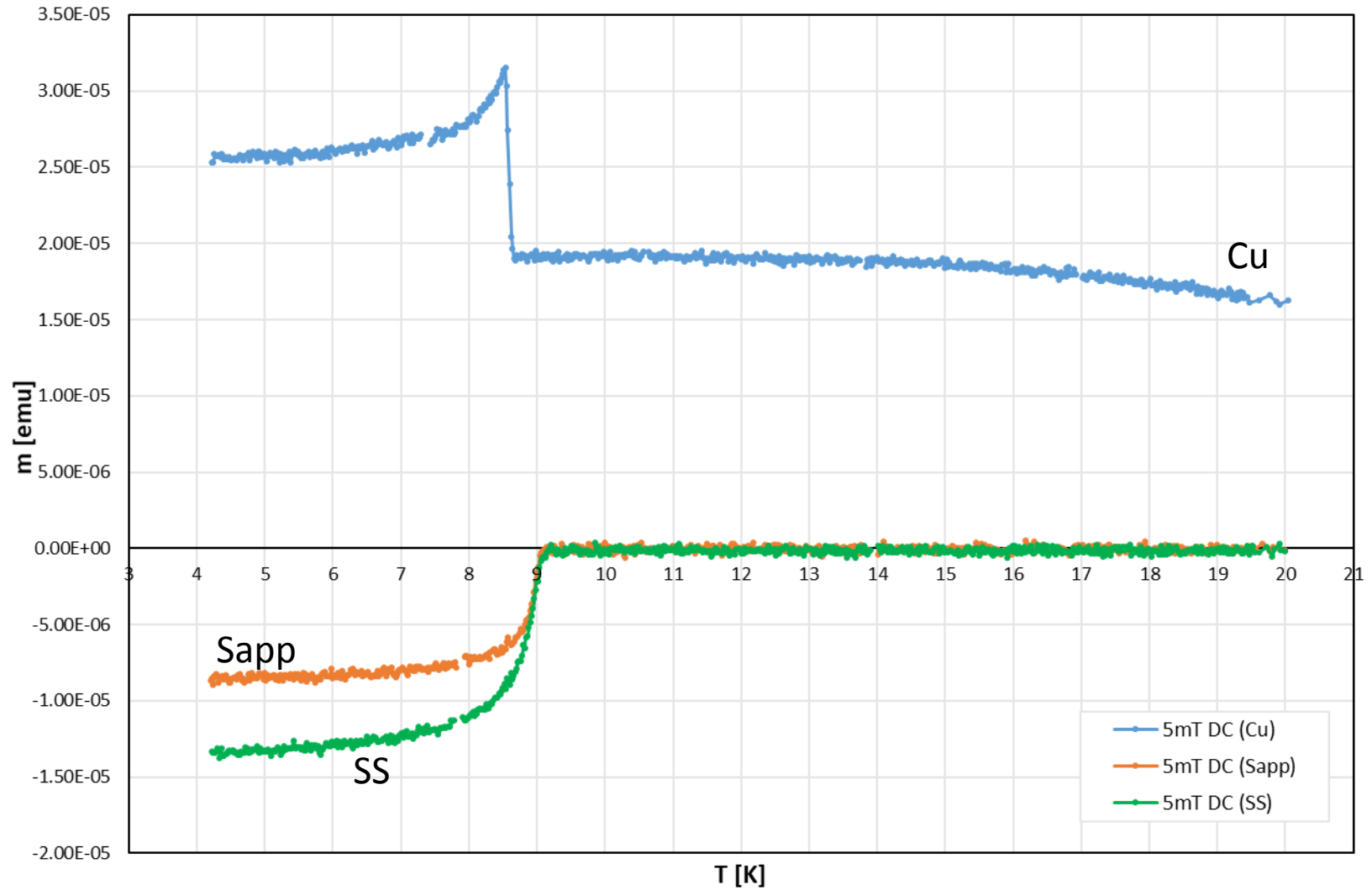
Cu, Ta, Sapphire subst., Self-Supported film (SS)



30/08/19 – Nb/[AlN/NbN]2

( Nb 2h, AlN 7min, NbN 12min )

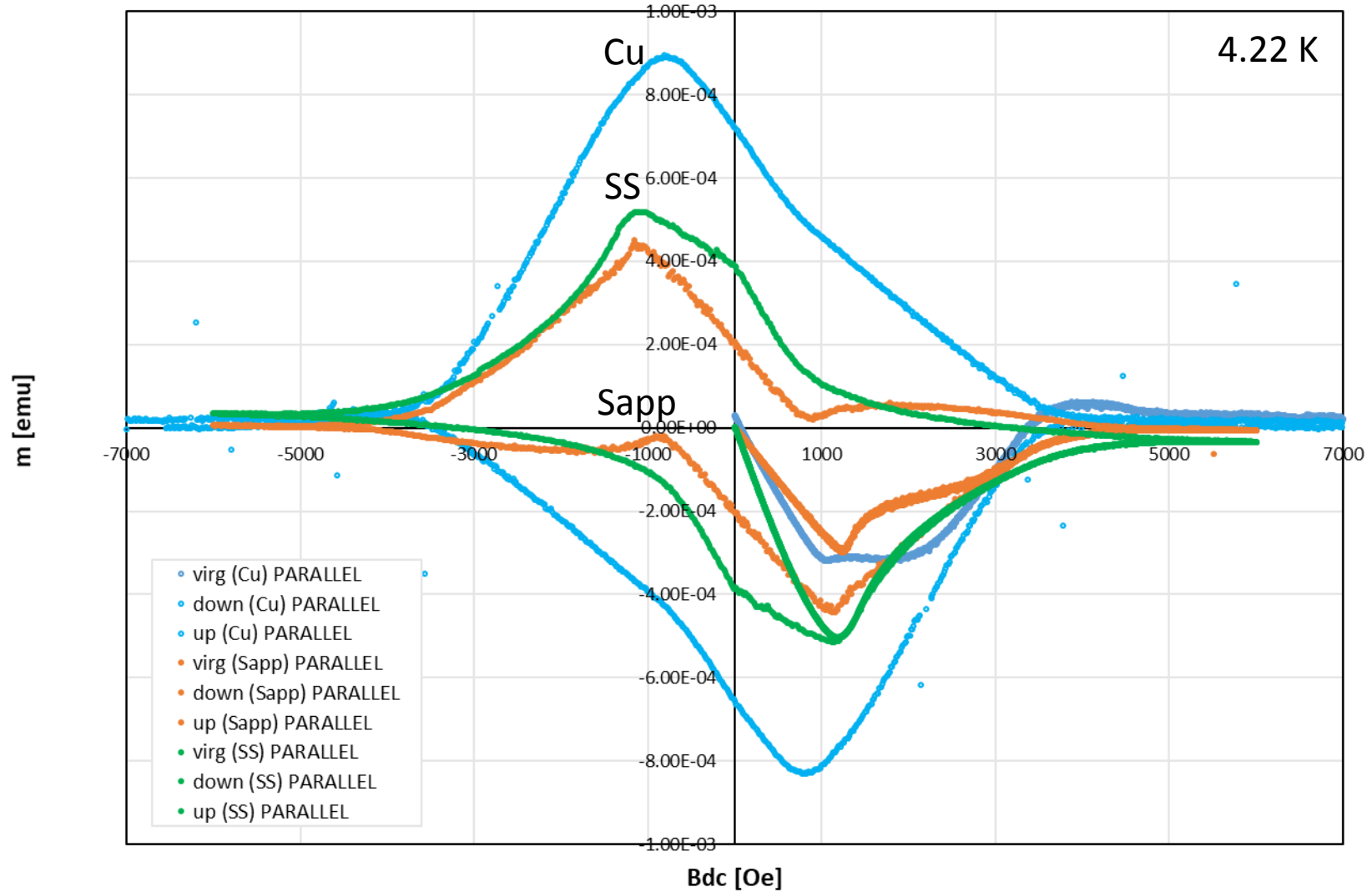
Cu, Ta, Sapphire subst., Self-Supported film (SS)



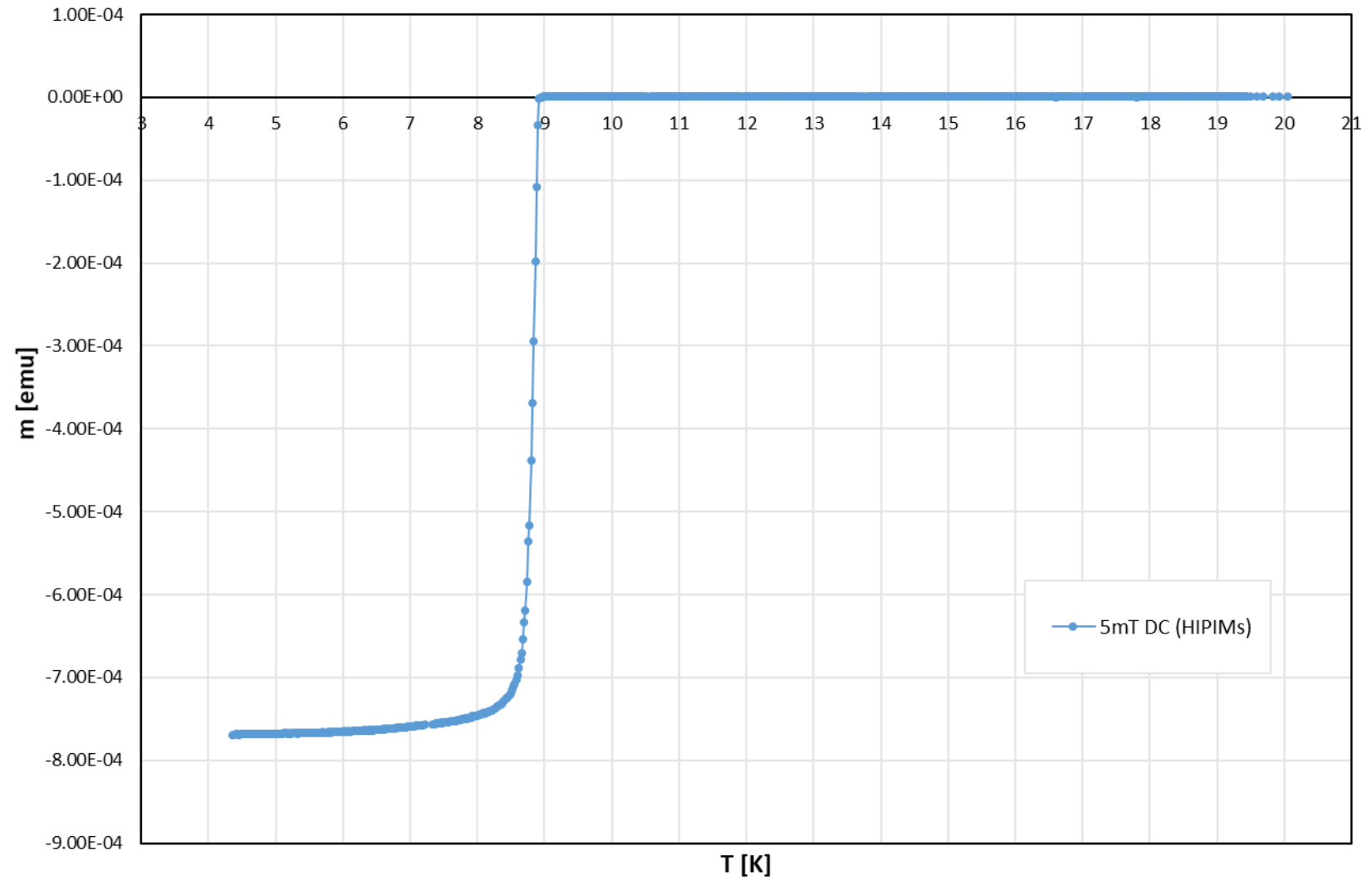
30/08/19 – Nb/[AlN/NbN]2

( Nb 2h, AlN 7min, NbN 12min )

Cu, Ta, Sapphire subst., Self-Supported film (SS)



# October 2019 – HIPIMs dep. Nb foil



# October 2019 – HIPIMs dep. Nb foil

