Runsheets

Niobium Deposition and Characterization

Metal Deposition	chip prep	chip clean	rinse with flowing ACT + IPA, 30s + 30s. N2 dry	wbsolv
	pre-dep	chamber conditioning	coat chamber with Ti (20 mins), then Nb (15 mins)	lesker-sputter
		sample load	load sample	
	dep-sputter	Nb sputtering	run dep recipe (Master Recipe Src 1 Downstream Control)	
	recovery	unload sample	unload and clean up area	

Characterization	resistivity	-	measure resistivity (center 1 point measurement)	prometrix
	step height	-	measure step height	dektak

Silicon Dioxide Deposition and Etching

SiO2 deposition		Chip clean	Rinse with flowing Acetone + IPA, 30 s + 30 s. N2 blow dry.	Solvent bench
	Oxide deposition	Chamber cleaning	Unload dummy wafers, procedure CLN350, 30 min (should be as long as the last deposition step)	ccp-dep
		Chamber conditioning	Load 4 carrier wafers, run the target recipe (SiO350_0)	
		Sample loading	Place the chip on the top of the bottom-left wafer, close to the center of the stage	
		SiOx deposition	SiO350_0, deposition rate 62.82 nm/min	
		Chamber cleaning	Unload dummy wafers, procedure CLN350, 30 min (should be as long as the last deposition step)	
		Thickness measurement	[65,70,75] deg, 40 rev/meas, high-accuracy	Woollam or Nanospec

SiO2 patterining	Photolitho	HMDS prime/Bake	Standard HMDS for wafers/Dehydrate bake 5 mins at 180C for chips	YES oven
		Spin coat	SPR3612 1.0 um; 40 s at 5500 rpm	Headway2
		Pre bake	Bake 1 min at 90C	Hotplate
		Exposure	Dose 100, defoc 0	Heidelberg 2

		Development	50s MF26A, 20s DI water rinse for chips/spray for wafers. Develop wafers upside-down to avoid redeposition of the resist residue.	wbmiscres
		Pattern verification	Observe the developed pattern under the optical microscope	Optical microscope
		Hardbake	3 min at 115C	Hotplate
		Cleaving	Cleave Siwafer into pieces if applicable	
	Etching SiO2	Chamber cleaning	Load dummy wafer, run oxygen plasma sequence ~20 min*;* Recipe *O2 Clean1*	PT-Ox
		Chamber conditioning	Run the target recipe for 5 minutes with the carrier wafer inside	
		Mounting on carrier	Small drop of the diffusion pump oil on the back of the chip, place on the wafer and spread the oil, gently moving the chip in x, y.	
		Etching	CF4 40 sccm, CHF3 10 sccm mix, total 50 sccm, 20 mT, 150 W bias; Recipe *HSS_OX-CF4CHF3*	
	Sample clean	Step measurement	Range: 6.5 micrometers, length: 800, duration: 10s, stylus force: 2 mg	Dektak
		Oxygen plasma clean	Indirect (bottom plate) ashing with 100W, 10 sccm O2 flow, 120 s	Asher
		Stripping resist	Spray acetone + IPA, 30 s each N2 blow dry; fill a short beaker with fresh acetone and put chips in, ultrasonic bath for 5 minutes, level ~1.5; N2 blowdry	Solvent bench
		Step meas.	Range: 6.5, l: 800, duration: 10s, stylus force: 5 mg	Dektak

Niobium Etching

Nb patterning	Photolitho	Dehydration baking	Dehydrate bake 5 mins at 180C	Hotplate
		Spin coat	SPR3612 1.0 um; 40 s at 5500 rpm	Headway2
		Pre bake	Bake 1 min at 90C	Hotplate
		Exposure	Dose 100, defoc 0	Heidelberg 2
		Development	50s MF26A, 40s DI water rinse, N2 blowdry	wbmiscres
		Pattern verification	Observe the developed pattern under the optical microscope	Optical microscope
		Hardbake	3 min at 115C	Hotplate
	Etching Nb	Chamber cleaning	Load carrier wafer, run clean sequence *Cham_Cln_Def_Cl2_SF6_O2*	Solvent bench
		Chamber conditioning	Run the target recipe for 5 minutes with the dummy wafer inside	PT-MTL
		Mounting on carrier	Small drop of the diffusion pump oil on the back of the chip, place on the wafer and spread the oil, gently moving the chip in x, y.	
		Etching	CF4/O2; Recipe: *DDas_Nb_Etch-2019a*	
	Sample	Step	Range: 6.5 micrometers, length: 800, duration: 10s,	Dektak

	clean	measurement	stylus force: 2 mg	
		Oxygen plasma clean	Indirect (bottom plate) ashing with 100W, 10 sccm O2 flow, 120 s	Asher
		Stripping resist	Spray acetone + IPA, 30 s each N2 blow dry; fill a short beaker with fresh acetone and put chips in, ultrasonic bath for 5 minutes, level ~1.5; N2 blowdry	Solvent bench
		Step measurement	Range: 6.5 micrometers, length: 800, duration: 10s, stylus force: 5 mg	Dektak