

# TECHNOLOGISCHES DURCHLAUFPROTOKOLL

Sample name: **i3MS\_V1**

Process Name: **El11 + 950 PMMA A4**

Date of start: **11.2.2019**

Date of completion:

**Substrate: (4" wafer patterned as in Step I - cut to 10 x 10 mm<sup>2</sup> chips)**








Material: prime FZ Si - undoped, 2 side polished

Orientation: 100

Resistivity [ $\Omega\text{cm}$ ]: 10k - 1000k

Thickness [ $\mu\text{m}$ ]: 252 $\pm$ 10

Ordered from MicroChemicals (Art. # WFA40525100X1719SNN1)

	Process step	Date	Ini- tials	Signature	Remarks
<b>STEP I:</b>	<b>large parts of CPW and DC antennas</b>				
<b>Resist</b>	spin LOL 2000 30s at 4000 rpm bake 5 min at 140°C	16.08.2018	KS		
<b>Resist</b>	spin S1813 30s at 4000 rpm bake 2 min at 115°C	16.08.2018	KS		
<b>Litho- graphy</b>	MA6 soft contact, 3 sec exposure, mask: CPW+2DC	16.08.2018	KS		
<b>Develop- ment</b>	10 sec MF319	16.08.2018	KS		
<b>Depo- sition</b>	5 nm Ti / 100 nm Au	21.08.2018	BS		
<b>Lift off</b>	remover 1165 at 60°C (ultrasonic only after at least 10 min, best even in fresh remover)	23.08.2018	KS		
	<b>4" wafer cut to 10 x 10 mm<sup>2</sup> chips - handled by Frau Schnabel - available in clean room</b>				
<b>STEP II:</b>	<b>magnetic structures</b>				
<b>Resist</b>	EL 11 spun 60s at 3000 rpm, no gyrset bake 5 min at 180°C → ~585 nm thick	<b>11.2.2019</b>			
<b>Resist</b>	950 PMMA A4 spun 60s at 3000 rpm, no gyrset bake 5 min at 180°C → ~248 nm thick	<b>11.2.2019</b>			

	Process step	Date	Ini- tials	Signature	Remarks
EBL	machine: <i>eline</i> design: <i>GDSII \ i3MS \ i3MS-V1_</i> <i>step1 - NiFe.gds</i> layers: <i>2,61</i> aperture 10 kV, 10 $\mu\text{m}$ , <i>19</i> mm; <i>77.6</i> pA; 200 $\mu\text{m}$ WF; 10 nm steps; area dose 100 $\mu\text{C}/\mu\text{m}^2$ → <i>2.76</i> mm/s	11.2.19		<i>KJS</i>	
Develop- ment	30 sec IPA:DI (3:7) stopper 30 sec IPA	12.2.19		<i>KJS</i>	
Depo- sition	50 nm $\text{Ni}_{80}\text{Fe}_{20}$ / <i>5</i> nm Al	12.2.19		<i>P. Schen</i>	
Lift off	acetone (with/without pipette)	14.2.19		<i>KJS</i>	
STEP III:	small parts of antennas				
Resist	EL 11 spinned 60s at 3000 rpm, no gyrset bake 5 min at 180°C → ~585 nm thick	14.2.19		<i>KJS</i>	
Resist	950 PMMA A4 spinned 60s at 3000 rpm, no gyrset bake 5 min at 180°C → ~248 nm thick	14.2.19		<i>KJS</i>	
EBL	machine: <i>eline</i> design: <i>GDSII \ i3MS \ i3MS-V1_</i> <i>step2 - antennas.gds</i> layers: <i>3,61</i> aperture 10 kV, <i>20</i> $\mu\text{m}$ , <i>19</i> mm; <i>84.9</i> pA; 200 $\mu\text{m}$ WF; 10 nm steps; area dose 100 $\mu\text{C}/\mu\text{m}^2$ → <i>9.5</i> mm/s	14.2.19		<i>KJS</i>	<i>I choose 20 <math>\mu\text{m}</math> aperture because 10 <math>\mu\text{m}</math> would've taken way too long! Now ~ 10.5 h exposure Stopped exposure at <u>G11</u></i>
Develop- ment	30 sec IPA:DI (3:7) stopper 30 sec IPA	14.2.19		<i>KJS</i>	
Depo- sition	5 nm Cr / 150 nm Au	19.2.19		<i>P. Schen</i>	<i>zu bedampfende Seite liegt unten, hat schon Au Kontakte drauf</i>
Lift off	acetone (with/without ultrasonic)	27.2.19	TH	<i>T. Hecker</i>	