

Appendix B

Process parameters for nanofabrication

Table B.1: Plasma enhanced chemical vapour deposition (PECVD) of SiO₂

Machine	Oxford Plasmalab System 90 PECVD
Deposition pressure	1 <i>Torr</i> (1.33 <i>mbar</i>)
SiH ₄ /N ₂ (5%/95%) flow	155 <i>sccm</i>
N ₂ O flow	710 <i>sccm</i>
RF power	20 <i>W</i>
RF discharge frequency	13.56 <i>MHz</i>
substrate support temperature	300°C

Table B.2: Plasma enhanced chemical vapour deposition (PECVD) of Si₃N₄

Machine	Oxford Plasmalab System 90 PECVD
Deposition pressure	0.5Torr (0.67mbar)
SiH ₄ /N ₂ (5%/95%) flow	777sccm
NH ₃ flow	50sccm
RF power	10W
RF discharge frequency	13.56MHz
substrate support temperature	300°C

Table B.3: Electron beam evaporation of Cr

Machine	Electrotech Ebeam Evaporator
Process pressure	0.75mTorr($1 \cdot 10^{-6}$ bar)
Gun voltage	10kV
Gun emission current	40mA
Filament current	350mA

Table B.4: Ion beam milling

Machine	Oxford Ionfab 300plus
Process pressure	6mTorr($8 \cdot 10^{-6}$ bar)
Bias voltage	390kV
Bias current	200mA
Acceleration voltage	-275V
Acceleration current	20mA
RF power	300W
RF discharge frequency	13.56MHz
incidence on substrate	normal
substrate rotation velocity	5rpm

Table B.5: Reactive ion etching (RIE)

Machine	Oxford Plasmalab RIE 80
Process pressure	$25mTorr$ ($33.3 \cdot 10^{-6}bar$)
CHF_3 flow	$6.0sccm$
Ar flow	$7.5sccm$
RF power	$200W$
RF discharge frequency	$13.56MHz$
DC bias	$-400V$