

Materials List for:

A Microfluidic-based Electrochemical Biochip for Label-free DNA Hybridization Analysis

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Materials

Name	Company	Catalog Number	Comments
4" Silicon wafer	Ultrasil	4-5664	Single side polished; P-type; Boron doped; Orientation 1-0-0; Thickness 500 micron; Resistance 10-20 ohm·cm
Shipley 1813 photoresist ("PR1")	Microchem		positive photoresist
AZ5214 photoresist ("PR2")	Hoechst Celanese		positive photoresist
SU-8 50 photoresist ("PR3")	Microchem		negative photoresist
Gold etchant	Transene	TFA	No dilution
Chromium etchant	Transene	1020AC	No dilution
PDMS elastomer	Dow Corning	3097366 1004	
PDMS curing agent	Dow Corning	3097358 1004	
Biopsy punching tool	Healthlink	BP20	
Tygon flexible tubing	Cole Parmer	R 3603	0.015"
Tygon flexible adapter	Cole Parmer	06417-41	0.0625"
1 ml syringe	Beckton-Dickenson	301025	
Monobasic potassium phosphate	Fluka	1551139	
Potassium phosphate dibasic anhydrous	Sigma	RES20765-A7	
Sodium chloride	Sigma-Aldrich	S7653	
tris(2-carboxyethyl)phosphine	Aldrich	C4706	
6-mercapto-1-hexanol	Aldrich	451088	
20x concentrated saline-sodium citrate buffer	Sigma	93017	
Potassium hexacyanoferrate(III)	Aldrich	455946	
Complementary ssDNA #1	Integrated DNA Technologies (IDT)	100 nmole DNA oligo	5'-GGGACGTCCACGGAGCGCTA TCGGAGCTTT-3'
Target ssDNA #2	Integrated DNA Technologies (IDT)	100 nmole DNA oligo	5'-/5ThioMC6-D/ ACGCGTCAGGTCATTGACGA ATCGATGAGT-3'
Complementary ssDNA #2	Integrated DNA Technologies (IDT)	100 nmole DNA oligo	5'-ACTCATCGATTGTCGAATGA CCTGACCCGT-3'
Target ssDNA #3	Integrated DNA Technologies (IDT)	100 nmole DNA oligo	5'-/5ThioMC6-D/ ACCTAGATCCAGTAGTTAGA CCCATGATGA-3'
Complementary ssDNA #3	Integrated DNA Technologies (IDT)	100 nmole DNA oligo	5'-TCATCATGGGTCTAACTACT GGATCTAGGT-3'
Instrument			

Plasma Enhanced Chemical Vapor Deposition (PECVD)	Oxford Instruments	PlasmaLab System 100	Chamber pressure 1,000 mTorr, Temperature 200 °C, RF power 20 W, Gasses: a) N ₂ O flow rate 710 sccm; b) a composition of 5% SiH ₄ and 95% N ₂ gasses flow rate 170 sccm, SiO ₂ growth rate 690 Å/min.
DC sputtering unit	AJA International	ATC 1800-V	For Chrome: Chamber pressure 10 mTorr, Argon flow rate 20 sccm, Supplied DC power 200 W, Sputter rate 10 nm/min. For Gold: Chamber pressure 10 mTorr, Argon flow rate 20 sccm, Supplied DC power 200 W, Sputter rate 36 nm/min.
E-beam evaporation system	Denton	Custom-built	For Titanium: Chamber pressure < 2 x 10 ⁻⁶ Torr, Supplied power to the e-gun 7.5 kW, Filament current 150-200 mA, Evaporation rate 6-10 Å/sec. For Platinum: Chamber pressure < 2 x 10 ⁻⁶ Torr, Supplied power to the e-gun 7.5 kW, Filament current 150-200 mA, Evaporation rate 2-3 Å/sec.
Potentiostat	CH Instruments	660D	
Syringe pump	KD Scientific	KDS230	