

Materials List for:

Syringe-injectable Mesh Electronics for Stable Chronic Rodent Electrophysiology

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Materials

Name	Company	Catalog Number	Comments
Motorized stereotaxic frame	World Precision Instruments	MTM-3	For mouse stereotaxic surgery
512-channel recording controller	Intan Technologies	C3004	A component of the neural recording system
RHD2132 amplifier board	Intan Technologies	C3314	A component of the neural recording system
RHD2000 3 feet ultra thin SPI interface cable	Intan Technologies	C3213	A component of the neural recording system
Mouse restrainer	Braintree Scientific	TV-150 STD	Standard 1.25 inch inner diameter; used to restrain the mouse during restrained recording sessions.
Si wafers	Nova Electronic Materials		3" P <100> .001-.005 ohm-cm 356-406 μm Thick Prime Grade SSP Si wafers w/2 Semi-Std. Flats & 6,000 Å ±5% Wet Thermal Oxide on both sides.
Photomasks (chrome on soda lime glass)	Advance Reproductions		Advance Reproductions and other vendors manufacture photomasks from provided design files. Our photomask design files are available by request or from the resource website, meshelectronics.org . Alternatively, some university clean rooms have mask writers for making photomasks on site.
AutoCAD software	Autodesk Inc.		Design software for drawing photomasks. A free alternative is LayoutEditor. Our photomask design files are available by request or from the resource website, meshelectronics.org .
Thermal evaporator	Sharon Vacuum		Used to evaporate Ni, Cr, and Au onto mesh electronics during fabrication. Many university clean rooms have this or a similar tool.
SU-8 2000.5 negative photoresist	MicroChem Corp.		Negative photoresist used to define the bottom and top passivating layers of mesh electronics.
MA6 mask aligner	Karl Suss Microtec AG		Used to align each photomask to the pattern on the wafer and expose the wafer to UV light. Most university clean rooms have this or a similar tool.

SU-8 developer	MicroChem Corp.		Used to develop SU-8 negative photoresist following exposure to UV light.
LOR3A lift-off resist	MicroChem Corp.		Used with Shipley 1805 photoresist to promote undercutting during metal lift-off processes
Shipley 1805 positive photoresist	Microposit, The Dow Chemical Company		Positive photoresist used to define metal interconnects and Pt electrodes in mesh electronics
MF-CD-26 positive photoresist developer	Microposit, The Dow Chemical Company		To develop S1805 positive photoresist after exposure in a mask aligner. Many university clean rooms stock this chemical.
Spin coater	Reynolds Tech		For coating wafers with positive and negative resists. Most university clean rooms have spin coaters.
PJ plasma surface treatment system	AST Products, Inc.		Used to oxidize the surface of mesh electronics prior to release into aqueous solution. Most university clean rooms have this or a similar tool.
Electron beam evaporator	Denton Vacuum		For evaporating Cr and Pt during fabrication of mesh electronics. Many university clean rooms have this or a similar tool.
Remover PG	MicroChem Corp.		Used to dissolve LOR3A and Shipley S1805 resists during metal lift-off
Ferric chloride solution	MG Chemicals	415-1L	A component of Ni etching solution
36% hydrochloric acid solution	Kanto Corp.		A component of Ni etching solution
Glass capillary needles	Drummond Scientific Co.		Inner diameter 0.40 mm, outer diameter 0.65 mm. Other diameters are available.
Micropipette holder U-type	Molecular Devices, LLC	1-HL-U	Used to hold the glass capillary needles during stereotaxic injection
1 mL syringe	NORM-JECT®, Henke Sass Wolf		Used for manual loading of mesh electronics into capillary needles
Polyethylene intrademic catheter tubing	Becton Dickinson and Company		Inner diameter 1.19 mm, outer diameter 1.70 mm
5 mL syringe	Becton Dickinson and Company		Used in the syringe pump for injection of mesh electronics in vivo
Eyepiece camera	Thorlabs Inc.	DCC1240C	Used to view mesh electronics within capillary needles during injection
ThorCam uc480 image acquisition software for USB cameras	Thorlabs Inc.		Used to view mesh electronics within capillary needles during injection
Syringe pump	Harvard Apparatus	PHD 2000	Used to flow precise volumes of solution through capillary needles during injection of mesh electronics
EXL-M40 dental drill	Osada	3144-830	For drilling the craniotomy
0.9 mm drill burr	Fine Science Tools	19007-09	For drilling the craniotomy
Hot bead sterilizer 14 cm	Fine Science Tools	18000-50	Used to sterilize surgical instruments
CM1950 cryosectioning instrument	Leica Microsystems		Used to slice frozen tissue into sections. Many universities have

			this or a similar tool available in a shared facility.
0.3% Triton x-100	Life Technologies		Used for histology
5% goat serum	Life Technologies		Used for histology
3% goat serum	Life Technologies		Used for histology
Rabbit anti-NeuN	Abcam	ab177487	Used for histology
Mouse anti-Neurofilament	Abcam	ab8135	Used for histology
Rat anti-GFAP	Thermo Fisher Scientific Inc.	PA516291	Used for histology
ProLong Gold Antifade Mountant	Thermo Fisher Scientific Inc.	P36930	Used for histology
Poly-D-lysine	Sigma-Aldrich Corp.	P6407-5MG	Molecular weight = 70-150 kDA
Right-angle end clamp	Thorlabs Inc.	RA180/M	Used to attach the pipette holder to the stereotaxic frame
Printed circuit board (PCB)	Advanced Circuits		Used to interface between mesh electronics and peripheral measurement electronics such as the Intan recording system. Advanced Circuits and other vendors manufacture and assemble PCBs based on provided design files. Our PCB design files are available by request or at the resource site meshelectronics.org
32-channel standard amplifier connector	Omnetics Connector Corp.	A79024-001	Component assembled onto the PCB
32-channel flat flexible cable (FFC)	Molex, LLC	152660339	Used as a clamping substrate when interfacing to mesh electronics I/O pads with the PCB-mounted ZIF connector
32-channel zero insertion force (ZIF) connector	Hirose Electric Co., LTD	FH12A-32S-0.5SH(55)	Component assembled onto the PCB