

SCHOOL OF MEDICAL SCIENCES

General Risk Assessment – Within labs or offices

Department: Physiology and Pharmacology	Room number: LG04	Date assessed: 11 March 2004
Procedure title: Chloriding silver wire by electrolysis.	Assessed by: Trevor Lewis	Supervisors signature:

Description of Procedure:

The surface of pure silver wire is cleaned either 1) by chemical etching in concentrated nitric acid and then washing in ammonia solution, or 2) by mechanical abrasion with fine grit wet-and-dry sandpaper and rinsed in reverse osmosis water. The prepared wire is then coated in silver chloride (chlorided) by the process of electrolysis in a aqueous solution of 100 mM HCl, where the prepared silver wire is the anode and second silver wire is used as a cathode. A potential difference of 15 mV and a current of 0.5 mA is applied between the anode and cathode.

Apparatus/Equipment used:

Displacement pipetters; beakers and flasks; fine grit wet-and-dry sandpaper; regulated 15 V DC power supply.

Chemical Hazards – Properties of chemicals to be used

Hazardous substance Reactants or Products	Hazards (see label and MSDS) Tick if relevant								MSDS viewed
	Flammable	Corrosive	Toxic	Harmful	Irritant	Oxidizing	Radioactive	Safe	
Concentrated nitric acid (HNO ₃)		Yes	Yes		Yes				Yes
Ammonia solution		Yes			Yes				Yes
100 mM HCl		Yes							Yes

First Aid Notes:

Eye Flush gently with running water, holding eyelids open for 20 minute period. Seek immediate medical attention.

Inhalation Leave area of exposure. If symptoms are evident or develop, seek urgent medical attention. If victim is not breathing, apply artificial respiration and seek urgent medical attention.

Skin Remove contaminated clothing and gently flush affected areas with water. Seek immediate medical attention. Launder clothing before reuse.

Review of Hazard/Risk

Step in process List major steps or tasks in process	Hazard	Risk (Harm)	EXISTING CONTROLS List all current controls that are already in place or that will be used to undertake the task e.g. -personal protective equipment - identify facility type, location - existing safety measures	Risk rating with existing controls?			ADDITIONAL CONTROLS REQUIRED Additional controls may be required to reduce the risk rating e.g. - greater containment - specific induction / training - additional personal protective equipment	Risk rating with additional controls?		
				Consequences	Likelihood	Rating		Consequences	Likelihood	Rating
1. Cleaning silver wire with concentrated nitric acid	Splashes and spills of concentrate nitric acid	Acid burns to exposed skin or to eyes	<ul style="list-style-type: none"> Restricting use of concentrated nitric acid to small volumes. Use of PPE, in particular eye protection, lab coat and nitrile gloves. All handling is carried out within a fume hood. 	2	D	L	<ul style="list-style-type: none"> Recommend that cleaning with wet-and-dry sandpaper is sufficient in most instances 	1	E	L
	Fumes	Acid burns and irritation to respiratory tract May cause blistering or burns to exposed skin, and severe irritation / damage to eyes	<ul style="list-style-type: none"> Restrict use to small volumes within a fume hood. Use of PPE, in particular eye protection, lab coat and nitrile gloves. 	2	D	L				
2. Rinsing silver wire in ammonia solution	Splashes and spills of ammonia solution	Irritation to respiratory tract	<ul style="list-style-type: none"> All handling is carried out within a fume hood. 	2	D	L	<ul style="list-style-type: none"> Recommend that cleaning with wet-and-dry sandpaper is sufficient in most instances 	1	E	L
	Fumes of ammonia gas evolved from solution	May cause blistering or burns to exposed skin, and severe irritation / damage to eyes	<ul style="list-style-type: none"> Restrict use to small volumes within a fume hood. Use of PPE, in particular eye protection, lab coat and nitrile gloves. 	2	D	L				
3. Cleaning wire with wet and dry sandpaper	Fine silver particles and abrasion dust	Irritation to skin and potentially to respiratory tract	<ul style="list-style-type: none"> All abrasion is carried out with sufficient water to lubrication the process and prevent the creation of dust particles, particularly airborne particles. 	1	E	L				
4. Coating the silver wire with silver chloride by electrolysis in 0.1 mM HCl	Electrical	Electric shock	<ul style="list-style-type: none"> Yearly inspection and testing of power cord and equipment (inspection tags attached). 	2	D	L				
	Splashes and spills of 0.1 mM HCl	Irritation to skin or irritation / damage to eyes	<ul style="list-style-type: none"> Use of PPE, in particular eye protection, lab coat and nitrile gloves 	1	D	L				

<u>Containment Facility used</u>	<u>Sterilization/Decontamination requirements</u>	<u>Disinfectant</u>	<u>Location of Spill Kit</u>	<u>Emergency information</u>
Location: LG04 PC level: PC1	N/A	Type: N/A Suitability:	Room: LG04 near the storage cabinet for corrosives	Contacts: Prof Peter Barry Dr Trevor Lewis Dr Andrew Moorhouse

Physical Hazards

<input type="checkbox"/> Explosion	<input type="checkbox"/> Hot liquids	<input checked="" type="checkbox"/> Spillage/Splash	<input checked="" type="checkbox"/> Chemical fumes	<input type="checkbox"/> Fire
<input type="checkbox"/> Heavy objects	<input type="checkbox"/> Cold liquids	<input type="checkbox"/> Sharps	<input type="checkbox"/> Hot equipment	<input type="checkbox"/> Other people
<input type="checkbox"/> Radiation	<input type="checkbox"/> Cold environment	<input type="checkbox"/> Ignition source	<input type="checkbox"/> Biological	<input type="checkbox"/> Other
<input type="checkbox"/> Pressure/vacuum	<input type="checkbox"/> Noise	<input checked="" type="checkbox"/> Electrical current	<input type="checkbox"/> UV/X-Ray/laser	

Comments:
The regulated 15 V DC power supply should be checked that it has a valid inspection tag. Any splashes or spills of concentrated nitric acid or ammonia solution should be restricted to small volumes (less than 50 ml), within the fume hood. Such small volumes should be easily contained if a spill occurred.

Control Measures Needed

<input checked="" type="checkbox"/> Protective clothing	<input checked="" type="checkbox"/> Fume cupboard	<input type="checkbox"/> Hearing protection	<input type="checkbox"/> PC1 lab
<input checked="" type="checkbox"/> Appropriate eye protection	<input checked="" type="checkbox"/> Appropriate footwear	<input type="checkbox"/> Handling aids	<input type="checkbox"/> PC2 lab
<input type="checkbox"/> Gloves	<input type="checkbox"/> Appropriate face mask	<input checked="" type="checkbox"/> training received	<input type="checkbox"/> Hot room
<input checked="" type="checkbox"/> Nitrile gloves	<input type="checkbox"/> Remove ignition source	<input type="checkbox"/> Assistance needed	<input type="checkbox"/> S.O.P viewed

Comments:
Appropriate eye protection, laboratory coat or gown, nitrile gloves and covered footwear should be worn. Hair should be tied back. Contact lenses should not be worn. Personnel should be trained in correct use of the fume hood. Handling of the concentrated nitric acid and ammonia solution should be carried out in the fume hood at all time to protect the user from the corrosive and severely irritant fumes.

Other Control Measures

Location of nearest Spill Kit: LG04, near corrosives cabinet	Location of nearest Eye Wash: First aid kit, LG04
Location of nearest First Aid Kit: LG04, near corrosives cabinet	Nearest Safety Shower: Not available

Clean up and disposal of contaminated waste

<input type="checkbox"/> Non halogenated hydrocarbons	<input type="checkbox"/> Gloves	<input type="checkbox"/> Other (please specify)
<input type="checkbox"/> Halogenated hydrocarbons	<input type="checkbox"/> Biological	<input type="checkbox"/> Radioactive
<input checked="" type="checkbox"/> Aqueous (not heavy metal)	<input type="checkbox"/> Sharps	
<input type="checkbox"/> Aqueous heavy metals	<input type="checkbox"/> Glass bin	

Clean up procedure:
Any spills of acids should be neutralized with a weak alkali and adsorbed with a suitable material (vermiculite, fuller's earth) for disposal.

Overall Risk Assessment:

<input checked="" type="checkbox"/> Low risk (simple assessment). File and keep this assessment.
<input type="checkbox"/> Risks are significant but can be effectively controlled. File and keep this assessment.
<input type="checkbox"/> Risks are significant and not easily controlled. Carry out a more detailed risk assessment and report. File and keep Consider other control measures and provide training.

Signed:	Date: 11 Mar 04	Date for review: 11 Mar 04
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