

## COSHH RISK ASSESSMENT

Assessment Reference Number:	iGEM_Exeter_COSHH_metal_ion_standards			
Date of Assessment :	26.07.2017			
Review Date:	Annually as standard or more frequently if (see examples below): Change to process or substance Control measures are failing Changes in toxicity information/revised MSDS Changes in personnel (vulnerability) Following an incident/accident/case of ill health Changes in frequency/quantity used			
Building / Laboratory / Work Area:	Room 432, Amory Building			
COSHH Assessors Name:				
Identify the persons carrying out the process / using this/these substance(s)	Lab technician: Angela Elliott iGEM students: Anna Macklin, Jake Binsley			
Who is likely to be exposed? (circle as appropriate)	Staff and/or Student(s)	Visitors	Maintenance	Other Groups <i>Give details</i>
How many people are likely to be exposed? (circle as appropriate)	0-5	6-9	>10	
Any vulnerable or high risks groups likely to be exposed? (circle as appropriate)	Young Person (staff or student under 18)	Pregnant Workers (staff or student)	Other Groups <i>Give details</i>	
Process details:				
<p><b>NB: If you are working with micro-organism(s) or biological agents please refer to the <a href="#">Microbiology Risk Assessment for information</a>.</b></p> <p><b>If working with Nano-materials please refer to the <a href="#">Working Safely with Nanomaterials in Research &amp; Development guidance document</a></b></p> <p><b>For work with chemicals continue completing this form.</b></p>				
Analysis of digested samples (solution in 5% nitric acidic solution) using Inductively Coupled Plasma-Optical Absorption spectrometry (ICP-OES), including use of mixed metal standards (5% nitric acidic solution of Ag, Al, As, B, Ba, Be, Ca, Cd, Ce, Cr3, Co, Cs, Cu, Dy, Er, Eu, Fe, Ga, Gd, Ho, K, La, Lu, Mg, Mn, Na, Nd, Ni, P, Pb, Pr, Rb, S, Se, Sm, Sr, Th, Tl, Tm, U, V, Yb, Zn; with each metal at between 0.01 to 2 mg/)				
5% HNO3				










What products/substances are being used in the process?								
Products / Substance(s) in process	<a href="#">Hazard or Risk phrases</a> defined for this product in the Material Safety Data Sheet	Red, Amber, Green, (R,A,G,)	What form is this hazard?		Quantity Used / Stored?	Length of Time Used? (Duration)	How often is it used? (Frequency)	Is there a <a href="#">Workplace Exposure Limit</a> for this product / substance?
5 % HNO3 (nitric acid)	Corrosive Oxidising agent H272 (amber)	RED	Gas		500ml	8 hours (wash solution within	variable/1 day per week average	Undiluted HNO3 STEL 1 ppm STEL 2.6 mg/m
			Liquid	y				
			Vapour					
			Fume					

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	H290 (amber) H314 (red)		Solid/ Powder/ Dust			contained system)		
Mixed metal standard (5 standards; between 0.01 to 2 mg/l) in 5% HNO3	Corrosive H314 Chronic aquatic toxicity H412	RED	Gas		25-50 ml of each standard	8 hours (within covered auto sampler)	variable/1 day per week average	Nitric acid component: STEL 1 ppm STEL 2.6 mg/m
			Liquid	y				
			Vapour					
			Fume					
		AMBER	Solid/ Powder/ Dust					
Sample digest solutions in 5% HNO3	Corrosive H314	RED	Gas		25ml of each sample	8 hours (within covered auto sampler)	variable/1 day per week average	Nitric acid component: STEL 1 ppm STEL 2.6 mg/m
			Liquid	y				
			Vapour					
			Fume					
			Solid/ Powder/ Dust					
			Liquid					
			Vapour					
			Fume					
			Solid/ Powder/ Dust					

## STOP CHECK AND CONSIDER THE NEXT QUESTION CAREFULLY

Can product(s) / substance(s) be substituted?	Y/N	Describe the options and the elimination / substitution process	
Can you eliminate any of the substances?	N		
Can you substitute any of the substances with less hazardous products?	N		
Are any of the substances being mixed?			
Number of substances being mixed	none	Highest risk (RAG) of the substances to be mixed?	n/a
OVERALL RISK OF THE SUBSTANCE(S) (without control measures in place)			
NB: Treat overall assessment as highest risk (RAG)			
Is the process likely to create new hazards or enhance any existing hazards e.g. producing a violent or highly exothermic reaction, toxic fumes, by-products etc.?			N
If Yes, detail any additional control measures that need to be in place		n/a	
What are the risks of fire and/or explosion etc.?			
Is there a risk of fire?			Y

Is there a risk of explosion?		N
Is there a risk of toxic fumes?		Y
Is there any other associated fire related risk with this process?		Y - oxidiser
If Yes to any of the above, detail any additional control measures that need to be in place.		<p>extraction hood in operation at all times</p> <p><b>Nitric acid</b> is an oxidizer: Contact with combustible/organic material may cause fire. Corrosive Material. Causes severe burns by all exposure routes. Thermal decomposition can lead to release of irritating gases and vapours. May ignite combustibles (wood paper, oil, clothing, etc.).</p>
<p><b>NB: A separate risk assessment may be also required in accordance with the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR).</b></p>		
What are the health effects?		
Possible route of entry into the body?		<p><b>Detail the health effects? (refer to the Material Safety Data Sheet)</b></p> <p>Consider both short-term and long-term health effects where applicable</p>
Ingestion	Y	If swallowed there is immediate severe irritation and damage. Reproductive effects have been observed on tests with laboratory animals.
Inhalation	Y	The vapour severely irritates the respiratory tract.
Contact e.g. skin	Y	Causes severe burns.
Absorption via skin and/or mucus membrane e.g. eyes, nose, mouth	N	Not absorbed, but vapour irritates the eyes. The liquid causes severe burns to the eyes.
Other e.g. young persons, pregnancy	N	
What are the first aid requirements: (consult the MSDS for details)		
Ingestion	Wash mouth out with large quantities of water. If the chemical has been swallowed, give plenty of water to drink. Obtain medical attention. Do not induce vomiting.	
Inhalation	Remove the casualty out of the danger area after first ensuring your own safety. Loosen the patient's clothing. If the casualty is unconscious, place in the recovery position and monitor breathing. Apply artificial respiration only if patient is not breathing.	
Contact e.g. skin	Flood the splashed surface with large quantities of running water. Remove contaminated clothing. Obtain medical attention.	
Absorption e.g. eyes, nose, mouth, skin	Irrigate thoroughly with water or saline solution for at least 15 minutes. Remove contact lenses, if present and easy to do. Obtain medical attention	
What are the required controls measures?		
Describe the arrangements		
Enclosed System e.g. glove box	N	
Fume Cabinet	N	
Extractor / Hood / Local Exhaust Ventilation	Y	extraction hood above autosampler & ICP-OES in operation at all times

<b>Ventilation / Air Change</b> <i>(If unknown seek advice from EDS/Campus Services)</i>	Y	Air makeup / ventilation within the lab
<b>Biological Safety Cabinet</b>	N	
<b>Sensors and / or alarms</b>	N	
<b>Personal Protective Equipment</b> <i>(see details below)</i>	Y	eye protection, suitable gloves and protective clothing
<b>Other:</b>	N	
<b>What are the PPE requirements (in addition to the standard issue laboratory coat)</b>		
 Eye Protection	 Respiratory Protection	 Face protection
 Gloves	 Hard Hat	 Ear Defenders
 Safety footwear	 Outer layer	 Apron
Y	N	N
<b>Describe the type / make/ model of PPE to be used – refer to the Material Safety Data Sheet(s) for guidance</b>		
Safety glasses		EN 374 protective gloves (Nitrile)
<b>STOP CHECK AND CONSIDER THE USE OF PERSONAL PROTECTIVE EQUIPMENT (PPE) CAREFULLY</b>		
Where Respirators (inc. FFP2 or 3 disposable masks) are required - face fit tests can be arranged for staff and students? Consult your Supervisor for advice or contact <a href="mailto:Safety@exeter.ac.uk">Safety@exeter.ac.uk</a> to book an appointment. Are there any Health Surveillance requirements to be considered? Consult your Supervisor for advice and guidance or contact <a href="mailto:occupationalhealth@exeter.ac.uk">occupationalhealth@exeter.ac.uk</a> to book an appointment		
<b>What actions to be taken in the event of spillage(s) and/or other emergency situations?</b>		
<b>NB: Refer to Material Safety Data Sheet(s) for guidance</b>		
Small Quantity <500ml	Wear appropriate clothing including gloves & safety glasses Use Drizit Laboratory spill kit (to dam and adsorb spillages) and/or Acid spill kit (Sodium Hydrogen Carbonate to neutralize acid). If blue tissue or other absorption material was used: let dry in fume hood and shovel in suitable containers for disposal. After cleaning, flush away traces with water . Ventilate area	
Large Quantity >500ml	n/a	
Do you have correct spill kit provisions to deal with spills (should they occur)?		Y
Are there any other emergency situations ( <i>not referenced above</i> ) to be considered?		Y

<p>If Yes, detail any additional control measures that need to be in place</p>	<p>Eyewash stations and safety showers are close to the workstation location</p>	
<p><b>What are the storage requirements for substances used during this process?</b></p>		
<p><b>NB: Refer to Material Safety Data Sheet(s) for guidance</b></p>		
<p>Are there any specific storage requirements for substances? (Is there a maximum recommended volume/quantity to be stored in one place or a specific temperature, type of cabinet, segregation etc.?) Also consider in laboratory and in holding areas for disposal</p>	<p><b>Y</b></p>	
<p>If Yes, detail the storage arrangements that need to be in place <i>Refer to Material Safety Data Sheet(s) for guidance</i></p>	<p>Keep containers tightly closed in a dry, cool and well-ventilated place.</p>	
<p><b>How should the substances used be disposed of?</b></p>		
<p>(include environmental impacts and by-products in your explanation if appropriate)</p>		
<p><b>NB: Refer to Material Safety Data Sheet(s) for guidance</b></p>		
<p>5% HNO<sub>3</sub> solution: Neutralise with sodium carbonate or 5% sodium hydroxide solution and run to waste with large volumes of water.</p> <p>metal standards solutions (including when mixed with 5% HNO<sub>3</sub>): collect in suitable container for disposal by specialist disposal by Labwaste</p>		
<p><b>What are the management arrangements i.e. Training, SOP's, Communication etc.?</b></p>		
<p><b>How will this risk assessment be communicated?</b></p>		
<p>(i.e. how will staff/students be informed of this assessment?)</p>		
<p>no other staff / student to carry out procedure</p>		
<p><b>Are Safe Systems of Work (SSoW) / Standard Operating Procedure (SOP) needed for this product/task/process in addition to this risk assessment?</b></p>	<p><b>N</b></p>	
<p>If Yes, detail / append the SSoW and/or the SOP if applicable</p>		
<p><b>Are training requirements necessary and who will provide this?</b></p>	<p><b>N</b></p>	
<p>If Yes, detail any specialist training required to undertake this process and who will provide said training</p>		
<p><b>Are there any remaining (residual) risks to be operationally managed?</b></p>	<p><b>N</b></p>	
<p>If Yes, detail any specific risks to be considered (e.g. pregnancy, vulnerable people, etc.)?</p>		
<p><b>Actions</b></p>		
<p><i>Use the table below to record actions to be taken if additional control measures are needed to meet the requirements of this risk assessment (identified above)</i></p>		

No.	Action <i>(describe)</i>	By Who?	Target Date	Date Completed

OVERALL RISK RATING OF THIS PROCESS (with control measures in place)	
<b>GREEN</b>	All Control Measures Implemented - Assessor to sign the risk assessment, Approver can then complete their sections once satisfied that the process/task etc. can proceed

Approval Process	
COSHH Assessors Signature:	
Assessors Name:	
Date:	
Confirmation received that all actions have been completed and the required control measures are in place:	Yes/No
Process Supervisors Name: <i>e.g. Principal Investigator, Line Manager</i>	
Approval Date:	
Confirmation that a copy is stored locally with the Laboratory Manager:	Yes/No

**NB:** Keep a copy of this risk assessment for your own records