UNIVERSITY OF CAMBRIDGE	Department: Astrophysics	Location: Mott 419 A
	Date: 18-05-2024	Assessment Reference:

HAZARDOUS SUBSTANCE RISK ASSESSMENT FORM

This document fulfils the requirements of the COSHH and DSEAR Regulations relating to a written risk assessment

********* **WHEN COMPLETING THE FORM REFER TO GUIDANCE NOTES ON SAFETY OFFICE WEBSITE** **********

Experiment / Procedure / Process / Activity / Demonstration (include a brief description)**:**

Prepare and perform the Iodine oscillator experiment (see included pdf for details). Involves mixing diluted sulfuric acid, dilute malonic acid, dilute solution of potassium iodate, starch, and dilute hydrogen peroxide. The only chemical risk worth noting is for the preparation of the dilute solutions.

Frequency (hourly, daily, weekly, monthly or 'one-off')**:** Once a year.

Hazardous substances to be used (List *ALL* substances including solvents, expected products and by-products)**:**

Can any of the substances be substituted with a less hazardous substance or form of the substance? **NO**

If yes, you must do so, or justify not using it. ___N/A_____

Substance	**Approx. quantity**	**Physical Form** gas, liquid, solid, dust	**Hazards** Toxic, flammable, corrosive, irritant, easily absorbed through skin etc	**WEL** Work Place Exp Limit	**Risk Phrases** / **GHS Hazard Statements** (see guidance note lists)	**Potential Exposure Route(s)** inhalation, ingestion, injection, absorption
30% hydrogen peroxide		Liquid	Corrosive, oxidizing, harmful if swallowed			Skin contact, ingestion.
98% sulfuric acid		Liquid	Highly corrosive, harmful if swallowed			Skin contact, ingestion
Potassium Iodate		Solid	oxidising, irritating, harmful if swallowed			Exposure to eyes from dust. Ingestion.
Malonic Acid		Solid	irritating, harmful if swallowed			Exposure to eyes from dust. Ingestion.
Manganese Sulfate		Solid	May cause organ damage if repeatedly consumed,			Ingestion.

Assessment Reference:

			toxic to aquatic life.			

Which are the significant chemical hazards? _____

Risks associated with the procedure: (non-chemical risks require additional risk assessment- see saftey office website}
The main risks are from the concentrated sulfric acid and hydrogen peroxide. Dilute solutions of sulfuric acid, themselves posing no safety risk, will be prepared by a competent student, postdoc, or faculty in a laboratory. Dilute solutions of hydrogen peroxide will be prepared on site by instructor and/or demonstrators at the start of the class, using proper safety gloves, glasses and lab coats.

Minor risks are from the potassium iodate and malonic acid, which can irritate eyes. Safety glasses are sufficient to protect from this irritation. Also, students will be instructed to weigh out small amounts using the spatulas in order to minimize the amount of aerosolized powders.

If the waste is left, fumes can be generated; these will result in concetrations of iodine far below toxic levels. In addition, demonstrators will be disposing of the experimental waste using sodium thiosulfate (non-toxic), which will fully reduce the iodine and prevent the generation of fumes.

Students will be instructed not to consume any of the experiment, or to consume anything else in the room while performing the experiment. Exposure will also be minimized by use of nitrile gloves.

Note: DSEAR risk considerations include:

Is there any substance used or formed that might give rise to a fire or explosion (e.g. reactive intermediates)? **no**

If yes, how will you ensure that no fire or explosion occurs (inc. the consideration of eliminating ignition sources): N/A

Is it reasonably foreseeable that the lower explosive limit (LEL) will be reached in the room or area of the work? **no**

If yes, a more detailed risk assessment may be required under the Dangerous Substances Explosive Atmospheres Regulations.

For further guidance on DSEAR see HSD073C and the DSEAR risk assessment form HSD080C

Are any of the substances a Category 1 or 2 carcinogen, a mutagen, a substance toxic to reproduction, a respiratory sensitizer or a skin sensitizer? no

(Risk Phrases: R42,R43,R45,R46,R49,R60,R61,R63,R64 or Hazard Statements:H334,H317,H350,H340,H350i,H360f,H360d,H361,H362)
Work with these compounds must be carried out in a fume cupboard where reasonably practicable. A health record must be completed.

Control Measures:

Containment:

Fume cupboard	×
Glove box / isolator	×
Safety cabinet	×
Local exhaust ventilation	

Additional:

Storage requirements (specify): _____

Other control measure (specify): N/A

Is health surveillance required? no

Personal Protective Equipment:

Lab coat / overalls	✓
Gloves	✓
Glove type:	___Nitrile gloves__
Eye Protection (i.e. safety glasses, goggles, face shield)	✓
type:	__safety glasses___
Respiratory protective equipment (RPE) *	×
RPE type:	_____

*** Under COSHH all RPE requires face-fit testing**

Assessment Reference:

Monitoring: Gas, Vapour or Dust **N/A** Specify what and how :

Are any additional controls required not covered above? (training, instruction, information or maintenance)

Words.

Are there additional non-chemical hazards requiring further risk assessment? **no** **Ref No:**

Waste Disposal Routes: Refer to University and departmental policy.

Consider segregation, containment and appropriate labelling of waste in order to avoid problems of mixing incompatible wastes.

Chlorinated solvent ☐ Aqueous (hazardous) ☐ Other (specify): _____

Non-chlorinated solvent ☐ Aqueous (non-hazardous) ☐

Identify incompatible wastes: _____**N/A**_____

NB: The mixing of incompatible wastes can introduce significant additional hazards, consult literature and MSDSs

Emergency Procedures (emphasise any special hazards)**:**

Fire Extinguisher: CO_2 × Dry Powder × L2 D-metal ×

Spillage/Uncontrolled Release: Spill Kit Evacuate Area Wash Down Area ×

Other (specify): _____Ensure adequate ventilation and use bleach to quench cyanide_____

What could happen if there was catastrophic failure of the apparatus? _____

In the event of an accident, who might be exposed? ___person working with the chemical and the people working in the lab_____

Emergency Treatment in Case of Contamination or Exposure:

Exposure/Contamination – standard procedures (special procedures MUST be detailed below) **Read and Understood** ✓

Mouth, Eyes, Skin Exposure – If powder enters eyes, rinse for 15 minutes, contact First Aider; **Lungs** N/A. **If swallowed** – contact a First Aider, get details of substance ingested and seek medical attention.

Other (specify): _____

It is agreed that application of the control measures specified will provide adequate management of the identified risks.

Name of assessor: Paul B Rimmer

Signature: (digital signature) **Date:** 3 February 2025

Name of co-signatory: (e.g. Supervisor / authorised deputy)

Signature: **Date:**

Note: This risk assessment is valid for one year after which time it MUST be reviewed.