

**Evaluation of mineral loss in cooking**

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Commenced on: 17 May 2018

Expires: 17 Aug 2019

Classes for which experiment is required

Teacher: Glen Arthur (training code 1)

Year Group: 12 Chemistry

Room	Period	Date
102	Afternoon	Fri 18/5/18

**Procedure or reference, including variations**

See attached .docx file.

**Equipment to be used****beaker, medium (250 mL to 1 L)***Potential hazards*

Breakage of beaker. Cuts from chipped rims.

*Standard handling procedures*

Inspect and discard any chipped or cracked beakers, no matter how small the damage. Sweep up broken glass with brush and dustpan; do not use fingers.

**burette***Potential hazards*

Possibility of breakage of glass and cuts. Attempting to turn a seized tap may result in breakage of stem. May be used for sword-fighting by students.

*Standard handling procedures*

Inspect and discard any chipped or cracked burettes no matter how small the damage. Sweep up broken glass with brush and dustpan; do not use fingers. Lubricate ground-glass taps with small quantity of vaseline; do not use silicone grease since this is difficult to remove during cleaning. Keep the original ground-glass tap with the burette. Teflon taps do not require lubrication and are preferable. Do not leave alkaline liquids in burettes since the glass is slowly corroded, changing the volume delivered, and glass-taps stick due to formation of sodium silicate.

**burette clamp****cuvette***Potential hazards*

Glass and quartz cuvettes are easily broken and fragments may cause cuts.

*Standard handling procedures*

Sweep up broken cuvette with dustpan and brush.

**electric hotplate and stirrer***Potential hazards*

IGNITION SOURCE, unless specially designed and certified. Do not heat flammable liquids on a hotplate that is not certified as sparkproof. Possibility of burns during heating and even after hotplate is turned off, because the hotplate retains heat. Electric cord may be damaged by heat and cause electric shock.

*Standard handling procedures*

Inspect regularly for signs of damage to cord, cord loose in plug, cord loose at entry to hotplate, or any signs of corrosion or other damage. Test and tag at regular intervals. Recommend that hotplate has a heatproof cord.

**flask, conical, medium (100 mL to 500 mL)***Potential hazards*

Flat bottom of flask prone to crack or break if dropped; chips around rim may cause cuts.

*Standard handling procedures*

Inspect and discard any chipped or cracked flasks no matter how small the damage. Sweep up broken glass with brush and dustpan; do not use fingers.

**glass stirring rod***Potential hazards*

Glass rod may break in hand causing deep cuts.

*Standard handling procedures*

Discard any cracked or broken stirring rods.

**measuring cylinder, glass, medium (100 mL to 500 mL)***Potential hazards**Standard handling procedures*

Glass cylinder may break; possibility of cuts from broken glass.	Discard any cracked or broken measuring cylinders. Do not heat any liquid in a measuring cylinder, since not designed for heating. Sweep up broken glass with brush and dustpan; do not use fingers.
<b>plastic funnel</b>	
<i>Potential hazards</i> Organic solvents may affect the plastic, causing leaks.	<i>Standard handling procedures</i> Do not use with organic solvents.
<b>tile</b>	
<i>Potential hazards</i> Breakage of tile. Cuts from chipped edges.	<i>Standard handling procedures</i> Inspect and discard any damaged tiles. Sweep up broken tile pieces with brush and dustpan; do not use fingers.
<b>transfer pipette</b>	
<i>Potential hazards</i> Possibility of ingestion of liquid if pipette filler is not used. ALWAYS USE A PIPETTE FILLER. Possibility of breakage of glass and cuts.	<i>Standard handling procedures</i> Provide a properly fitting pipette filler with every pipette. Inspect and discard any chipped or cracked pipettes no matter how small the damage. Sweep up broken glass with brush and dustpan; do not use fingers.
<b>volumetric pipette</b>	
<i>Potential hazards</i> Possibility of ingestion of liquid if pipette filler is not used. ALWAYS USE A PIPETTE FILLER. Possibility of breakage of glass and cuts.	<i>Standard handling procedures</i> Provide a properly fitting pipette filler with every pipette. Inspect and discard any chipped or cracked pipettes, no matter how small the damage. Sweep up broken glass with brush and dustpan; do not use fingers.

## Chemicals to be used and produced

<b>ammonia 1.4-2.8 M (2.5-5% wt/wt)</b>				<b>NH<sub>3</sub>(aq)</b>	
Class: nc	PG: none	Users: 7-12*	Training: 1-5*	UN: 2072	CAS: 1336-21-6
GHS data:					
<b>WARNING</b>	Harmful if swallowed Causes skin irritation Causes serious eye irritation May cause respiratory irritation Toxic to aquatic life				
<i>Potential hazards</i> Irritates eyes, lungs and skin.					

<b>calcium nitrate &lt;0.06 M (&lt;1% wt/wt)</b>				<b>Ca(NO<sub>3</sub>)<sub>2</sub>(aq)</b>	
Class: nc	PG: none	Users: 7-12	Training: 1-6	CAS: 10124-37-5	
GHS data: Not classified as a hazardous chemical.					
<i>Potential hazards</i> Low toxicity.					

<b>eriochrome black T, solution</b>				<b>Na<sub>2</sub>O<sub>2</sub>CC<sub>6</sub>H<sub>4</sub>C<sub>13</sub>H<sub>2</sub>O<sub>3</sub>Br<sub>2</sub>(NO<sub>2</sub>)<sub>2</sub></b>	
Class: nc	PG: none	Users: 7-12	Training: 1-5	CAS: 1787-61-7	
GHS data: Not classified as a hazardous chemical.					
<i>Potential hazards</i> Low toxicity.					

<b>ethanol 5-13 M (24-70% wt/wt) (ethyl alcohol)</b>				<b>CH<sub>3</sub>CH<sub>2</sub>OH(aq)</b>	
Class: 3	PG: III	Users: 7-12	Training: 1-6	UN: 1170	CAS: 64-17-5

GHS data:

**ANGER**



Flammable liquid and vapour  
Causes eye irritation

*Potential hazards*

FLAMMABLE. Liquid irritates eyes. Prolonged contact with skin causes irritation. Low toxicity. Higher concentrations form violently explosive mixtures with nitric acid and other oxidising agents. Reaction of 70% wt/wt ethanol with acidified dichromate solution is highly exothermic. Potassium reacts explosively with aqueous ethanol.

*Standard handling procedures*

70% wt/wt ethanol is the optimum concentration for killing bacteria and is often used as a sterilizing liquid. Ethanol is a controlled substance, not usually available in schools. Aqueous methylated spirits is the usual substitute in schools.

**ethylenediamine tetraacetic acid, solution**



Class: nc

PG: none

Users: 11-12

Training: 1,2,5

UN: 3077

CAS: 60-00-4

GHS data: Not classified as a hazardous chemical.

*Potential hazards*

Low toxicity.

**sodium hydroxide <0.12 M (0.5% wt/wt)**



CAS: 1310-73-2

Class: nc

PG: none

Users: 7-12\*

Training: 1-6

GHS data: Not classified as a hazardous chemical.

*Potential hazards*

Eye irritant.

**water <43.5°C (cold-warm)**



CAS: 7732-18-5

Class: nc

PG: none

Users: K-12

Training: 1-6

GHS data: Not classified as a hazardous chemical.

*Potential hazards*

Cold water causes numbness and hypothermia if exposure is prolonged. Water below 43.5°C is generally considered safe for adults and children.

*Standard handling procedures*

Water in a laboratory should not be drunk, due to the possibility of chemical contamination. Water spilled on the floor may be a slip hazard.

**Others**

o-cresol red indicator  
spinach

**Knowledge**

I/we have read and understood the potential hazards and standard handling procedures of all the equipment, chemicals and biological items, including living organisms.

I/we have read and understood the (Material) Safety Data Sheets for all chemicals used and produced.

I/we have copies of the (Material) Safety Data Sheets of all the chemicals available in or near the laboratory.

**Agreement by student(s)**

I/we, Lyron Wnderbaum, agree to conduct this experiment safely in accordance with school rules and teacher instructions.

**Risk assessment**

I/we have considered the risks of:

fire	breakage of equipment	electrical shock	radiation
explosion	cuts from equipment	escape of pathogens	waste disposal
chemicals in eyes	sharp objects	heavy lifting	inappropriate behaviour
inhalation of gas/dust	rotating equipment	slipping, tripping, falling	allergies
chemicals on skin	vibration and noise	falling objects	special needs
runaway reaction	pressure	heat and cold	other risks

**Assessment by student(s)**

I/we have assessed the risks associated with performing this experiment in the classroom on the basis of likelihood and consequences using the School's risk matrix, according to International Organization for Standardization Standard ISO 31000:2009.

I/we consider the inherent level of risk (risk level without control measures) to be:

**Low risk**

Medium risk

High risk

Extreme risk

Risks will therefore be managed by routine procedures in the classroom.

### Certification by teacher

I have assessed the risks associated with performing this experiment in the classroom on the basis of likelihood and consequences using the School's risk matrix, according to International Organization for Standardization Standard ISO 31000:2009. I confirm that the risk level and control measures entered by student(s) above are correct and appropriate.

**Name:** .....

**Signature:** .....

**Date:** .....

### Certification by Laboratory Technician

I have assessed the risks associated with preparing the equipment, chemicals and and biological items, including living organisms, for this experiment and subsequently cleaning up after the experiment and disposing of wastes, on the basis of likelihood and consequences using the School's risk matrix, according to International Organization for Standardization Standard ISO 31000:2009.

I consider the inherent level of risk (risk level without control measures) to be:

☐ Low risk    ☐ Medium risk    ☐ High risk    ☐ Extreme risk

Where the risk level is "medium risk", "high risk" or "extreme risk", the following control measures will be employed:

*Control measures (attach further pages as required):*

☐ safety glasses    ☐ gloves    ☐ lab coat    ☐ apron    ☐ fume cupboard

With the specified control measures in place, I have found that all the risks are "low risk". Risks will therefore be managed by routine procedures in the laboratory, in combination with the specified control measures.

**Name:** .....

**Signature:** .....

**Date:** .....

### Monitoring and review

This risk assessment will be monitored using comments below and will be reviewed within 15 months from the date of certification.

*Attach further pages as required*