

Thompson lab hazards assessment

Emergency contact: in case of medical/fire/security/environmental emergency, including large spills, call Dalhousie Emergency Security Hotline on extension 4109 (call 902-494-4109 if calling from a mobile/cellular/network/off-campus phone device)

University Safety Officer at Dalhousie Environmental Health and Safety Office: Steve Beaton (telephone 1-902-494-1934/2495, steve.beaton@dal.ca) – contact in case of chemical/lab safety queries, including for advice relating to non-emergency matters and small spills clean up

Department/Building: **Chemistry/Chemistry Building**

Investigator: **Dr. Alison Thompson (telephone 1-902-494-6421, alison.thompson@dal.ca)**

Departmental safety officer: **Dr. Mark Obravac (telephone 1-902-494-3305, mark.obravac@dal.ca)**

Assessment completed by: **Dr. Alison Thompson, July 3rd 2020**; Labs covered: **435, 442** and the back part of **441** (Chemistry Building)

Essential resources for the Thompson lab: **SDS documentation (online for every chemical); Standard Operating Procedures (SOPs, found in lab 442); Chemical Hazards Assessment Table (to be filled in, discussed and signed prior to commencing every experiment); overnight experiment forms, unattended reaction forms and sign outside 442 and 435 (to be filled in/posted prior to commencing every experiment); Dalhousie University Accident/Incident form to be filled in for any incident or near miss incident; long pants and fully enclosed shoes are mandatory.**

Spill kits: **full spill kit near lab 423** (absorbents, gloves, goggles, bags, etc.); mini spill kit (absorbent) at lab 442 main door.

Signature of assessor: _____

Activity	Potential hazard	PPE required	Spill/accident procedure
Working in a wet chemistry lab	Burns; cuts; falls; impact injury; poisoning through contact with skin and eyes; poisoning through inhalation; environmental contamination through leak or spill; frostbite; fire.	Lab coat, protective CSA-approved eye-wear, nitrile or rubber gloves; inspect glassware before use; use only undamaged glassware; usage of chemicals must occur inside a properly functioning fume-hood with the sash low; understand MSDS documentation for all chemicals involved; follow relevant SOPs for every operation; read manuals and receive training for all equipment involved; fill in lab-book Chemical Hazards Assessment Table prior to beginning each experiment; do not lift heavy loads without proper equipment and/or help; do not work alone in labs.	<p>Shout to lab-mates for help. Seek immediate medical help if necessary, via Dalhousie Security (4109/494-4109).</p> <p>Assess extent of danger. Take appropriate action according to hazards present, e.g. fire, burn, shock, poisoning, explosion.</p> <p>Evacuate lab if necessary; help others if possible without causing harm to more individuals. Activate fire alarm. Close lab door when leaving.</p> <p>Seek medical attention as necessary based on severity of injury.</p> <p>Do not use respirators (found in full spill kit), unless you have been trained to do so and feel comfortable and capable of using such equipment properly.</p> <p>After clean up and neutralization/disposal, wash affected floor/bench area with detergent and water, rinse well, dispose to drain.</p>

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Working with sharps (e.g. needles and broken glass)	Cuts, exposure.	Lab coat, protective CSA-approved eye-wear, thick nitrile or rubber gloves; inspect glassware before use; use only undamaged glassware. Use dustpan and brush to sweep up glass breakages, never bare hands.	Seek immediate medical help if necessary, via Dalhousie Security (4109/902-494-4109). Shout to lab-mates for help. In case of cuts, run injury under cold water to ensure removal of glass or contamination. Seek medical help based on severity of injury and/or exposure.
Working with laboratory equipment, e.g. sonicator, melting-point apparatus, purification unit, glove-box, spectrometers, microwave-based robot system, hot-plates	Cuts, exposure, electric shock, bright light, spills of flammables/corrosives.	Lab coat, protective CSA-approved eye-wear, nitrile or rubber gloves; follow instructions in appropriate manual for each piece of instrumentation; seek training before use.	Seek immediate medical help if necessary, via Dalhousie Security (4109/902-494-4109). Shout lab-mates for help. Assess extent of danger. Take appropriate action according to hazards present, e.g. fire, burn, shock, poisoning, explosion.
Working with ultraviolet radiation, e.g. TLC lamp, spectrometers	Eye and skin damage	Do not look into lamp under normal circumstances; UV-goggles required if looking directly at lamp; nitrile or rubber gloves.	Seek immediate medical help if necessary, via Dalhousie Security (4109/902-494-4109). Shout to lab-mates for help. Seek medical help based on severity of injury.
Working with a mercury thermometer or vacuum gauge	Toxic poisoning and environmental contamination by prolonged inhalation and/or skin exposure if the thermometer or gauge breaks to reveal mercury.	Lab coat, protective CSA-approved eye-wear, nitrile or rubber gloves.	Seek immediate medical help if necessary, via Dalhousie Security (4109/902-494-4109). Shout to lab-mates for help. Assess extent of spill danger. In case of large spill or a spill where mercury is difficult to access, or is on clothing/furniture/blinds etc., contact Dalhousie Chemistry Stores and/or Dalhousie Environmental Health and Safety Office for assistance with clean up and disposal. Immediately remove any contaminated clothing, and bag it. For small spills, wear proper PPE and isolate mercury; use stiff card to carefully/slowly roll mercury beads together on floor/bench etc.; shine a flashlight on the surface to identify small mercury droplets that escape into cracks and crevices; roll/scrape onto paper towel or into an envelope, and fold towel/envelope to secure; bag; call Dalhousie Environmental Health and Safety Office to initiate monitoring and for disposal.

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Working with toxic, acutely toxic and carcinogenic chemicals	Exposure through inhalation, ingestion; contact with skin or eyes through splashes or spills.	Lab coat, protective CSA-approved eye-wear, nitrile gloves (double-glove for acutely toxic chemicals); transfers (e.g. for weighing) of highly toxic materials should take place in a properly operating fume-hood with the sash low.	<p>Seek immediate medical help if necessary, via Dalhousie Security (4109/902-494-4109). Shout to lab-mates for help.</p> <p>Assess extent of danger. Make decision whether to help others to evacuate the lab (close door, pull fire alarm, evacuate) or instigate clean up. If respirator use is required, evacuate lab and contact Dalhousie Environmental Health and Safety Office (or Security after hours).</p> <p>In case of spill on clothing or skin, remove clothing if feasible without creating further exposure, flush affected area under drench hose/eye-wash; use shower in lab 435 if larger area is affected.</p> <p>To clean up small spills not requiring respirator use: absorb liquids onto kitty litter or equivalent (begin by forming a dike to surround the spill and prevent further spread); sweep up; bag; store in fume-hood, contact Dalhousie Environmental Health and Safety Office for assistance with disposal.</p> <p>Wash affected area with detergent and water, rinse well, dispose to drain.</p>
Working with air- and/or moisture-sensitive materials	Skin and eye damage; fire.	Use inert atmosphere glove-box or manifold system; lab coat (flame-resistant lab coat when using moisture-sensitive materials), protective CSA-approved eye-wear, nitrile gloves (double for acutely toxic chemicals).	<p>Seek immediate medical help if necessary, via Dalhousie Security (4109/902-494-4109). Shout to lab-mates for help.</p> <p>Assess extent of danger. Make decision whether to help others to evacuate the lab (close door, pull fire alarm, evacuate) or instigate clean up. If respirator use is required, evacuate lab and contact Dalhousie Environmental Health and Safety Office.</p> <p>In case of spill or fire on clothing or skin, remove clothing if feasible without creating further exposure, flush affected area under drench hose/eye-wash; use shower in lab 435 if larger area is affected.</p> <p>To clean up small spills not requiring respirator use: dike around solid spills using absorbent, then smother working from outside to inside; use class D extinguisher if necessary; for small scale-spills, quench using appropriate reagent as per MSDS (e.g. isopropanol, methanol – these solvents contain small percentages of water; when quenched using these reagents (no more gas evolution), THEN add small amount of water to complete the process); absorb liquids onto kitty litter or equivalent; sweep up; bag; store in fume-hood; contact Dalhousie Environmental Health and Safety Office for assistance with disposal.</p> <p>In case of fire, isolate danger if possible/safe (close-cap, remove other flammables from proximity); use one extinguisher if practical and if comfort/training enables; if fire persists, evacuate – close door to the lab upon leaving and pull the fire alarm.</p> <p>Wash affected area with detergent and water, rinse well, dispose to drain.</p>

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Working with corrosive materials, including liquids with splash hazards	Poisoning; skin and eye burns.	Lab coat, protective CSA-approved eye-wear, nitrile or rubber gloves; transfers (e.g. for weighing) of highly toxic materials should take place in a properly operating fume-hood with the sash low.	<p>Seek immediate medical help if necessary, via Dalhousie Security (4109/902-494-4109). Shout to lab-mates for help.</p> <p>Assess extent of danger. Make decision whether to help others to evacuate the lab (close door, pull fire alarm, evacuate) or instigate clean up. If respirator use is required, evacuate lab and contact Dalhousie Environmental Health and Safety Office.</p> <p>In case of spill on clothing or skin, remove clothing if feasible without creating further exposure, flush affected area under drench hose/eye-wash; use shower in lab 435 if larger area is affected.</p> <p>To clean up small spills not requiring respirator use: absorb liquids onto kitty litter or equivalent (begin by forming a dike to surround the spill and prevent further spread); sweep up; bag; store in fume-hood, contact Dalhousie Environmental Health and Safety Office for assistance with disposal.</p> <p>Wash affected area with detergent and water, rinse well, dispose to drain.</p>
Working with oxidizing materials, including liquids with splash hazards	Poisoning; skin and eye burns; fire; intensification of fire; explosion.	<p>Lab coat, protective CSA-approved eye-wear, nitrile or rubber gloves; usage should take place in a properly operating fume-hood with the sash low.</p> <p>Do not store oxidizers near other chemicals of a non-oxidizing nature.</p>	<p>Seek immediate medical help if necessary, via Dalhousie Security (4109/902-494-4109). Shout to lab-mates for help.</p> <p>Assess extent of danger. Make decision whether to help others to evacuate the lab (close door, pull fire alarm, evacuate) or instigate clean up. If respirator use is required, evacuate lab and contact Dalhousie Environmental Health and Safety Office.</p> <p>In case of spill on clothing or skin, remove clothing if feasible without creating further exposure, flush affected area under drench hose/eye-wash; use shower in lab 435 if larger area is affected.</p> <p>Do not use combustible materials (e.g. paper towels, cloth) for clean up of oxidizers.</p> <p>To clean up small spills not requiring respirator use: small amounts of unused or unwanted pyrophoric materials must be destroyed by careful quenching of the residue; use absorbent/kitty litter to absorb the spillage (begin by forming a dike to surround the spill and prevent further spread) transfer the materials to an appropriate reaction flask for hydrolysis and/or neutralization; dilute significantly with an unreactive solvent such as heptane or toluene and place the flask in an ice water cooling bath; slowly add isopropanol to quench pyrophoric materials; upon completion, add methanol as a more reactive quenching agent to ensure completion; finally, add water drop-wise to make sure there are no pockets of reactive materials. Dispose of as hazardous waste.</p> <p>Wash affected area with detergent and water, rinse well, dispose to drain.</p>

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Working with acids and strong acids, including liquids with splash hazards	Irritation to respiratory system through inhalation; skin and eye burns; violent reaction with water.	Lab coat, protective CSA-approved eye-wear, nitrile or rubber gloves. Do not store acids near bases.	Seek immediate medical help if necessary, via Dalhousie Security (4109/902-494-4109). Shout to lab-mates for help. Assess extent of danger. Make decision whether to help others to evacuate the lab (close door, pull fire alarm, evacuate) or instigate clean up. If respirator use is required, evacuate lab and contact Dalhousie Environmental Health and Safety Office. In case of spill on clothing or skin, remove clothing if feasible without creating further exposure, flush affected area under drench hose/eye-wash; use shower in lab 435 if larger area is affected. To clean up small spills not requiring respirator use: carefully neutralize and absorb using a mixture of absorbent and solid sodium bicarbonate/soda ash; begin by forming a dike around the spill, then work inwards towards the spilled material until bubbling ceases; sweep up; bag; store in fume-hood, contact Dalhousie Environmental Health and Safety Office for assistance with disposal. Discuss the need to add water to the spill mix, and alter pH to neutral before disposal as aqueous waste. Wash affected area with detergent and water, rinse well, dispose to drain.
Working with bases and strong bases, including liquids with splash hazards	Irritation to respiratory system through inhalation; skin and eye burns; violent reaction with water.	Lab coat, protective CSA-approved eye-wear, nitrile or rubber gloves. Do not store bases near acids.	Seek immediate medical help if necessary, via Dalhousie Security (4109/902-494-4109). Shout to lab-mates for help. Assess extent of danger. Make decision whether to help others to evacuate the lab (close door, pull fire alarm, evacuate) or instigate clean up. If respirator use is required, evacuate lab and contact Dalhousie Environmental Health and Safety Office. In case of spill on clothing or skin, remove clothing if feasible without creating further exposure, flush affected area under drench hose/eye-wash; use shower in lab 435 if larger area is affected. To clean up small spills not requiring respirator use: carefully absorb using absorbent/kitty litter; begin by forming a dike around the spill, then work inwards towards the spilled material until bubbling ceases; sweep up; bag; store in fume-hood, contact Dalhousie Environmental Health and Safety Office for assistance with disposal. Discuss the need to add water to the spill mix, and alter pH to neutral before disposal as aqueous waste. Wash affected area with detergent and water, rinse well, dispose to drain.

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Working with organic solvents or flammable organic compounds	Skin or eye damage; potential poisoning through skin contact; flammable – risk of fire.	Lab coat, protective CSA-approved eye-wear, nitrile or rubber gloves; transfer and use in a properly operating fume-hood with the sash low; keep away from sources of ignition such as electrical contacts, open flames and hot surfaces.	<p>Seek immediate medical and/or fire help via Dalhousie Security (4109/902-494-4109 if necessary). Shout to lab-mates for help.</p> <p>Assess extent of spill danger. Make decision whether to help others to evacuate the lab (close door, pull alarm, evacuate) or instigate clean up.</p> <p>In case of burning clothing or skin, flush affected area under drench hose/eye-wash; use shower in lab 435 if larger area is affected.</p> <p>In case of fire, isolate danger if possible/safe (close-cap, remove other flammables from proximity); use one extinguisher if practical/safe and if comfort/training enables; if fire persists, evacuate – close door to the lab upon leaving and pull the fire alarm.</p> <p>If respirator use is required, evacuate lab and contact Dalhousie Environmental Health and Safety Office. To clean up small spills not requiring respirator use: absorb liquids onto kitty litter or equivalent; sweep up; bag; store in fume-hood, contact Dalhousie Environmental Health and Safety Office for assistance with disposal. Wash affected area with detergent and water, rinse well, dispose to drain.</p>
Working with ovens, hotplates, oil/water baths and oil pumps, including splash danger from hot oils	Burns from hot surfaces and liquids.	<p>Insulating gloves to handle items from oven or hot items such as hotplates or oil baths; lab coat, protective CSA-approved eye-wear.</p> <p>Let equipment cool to room temperature before lifting/moving it.</p>	<p>Seek immediate medical and/or fire help via Dalhousie Security (4109/902-494-4109 if necessary). Shout to lab-mates for help.</p> <p>In case of burns, extensively run injured area under cold water (drench-hose, or shower in 435) to cool area and to gently wash off hot material (e.g. oil).</p> <p>Seek medical attention as necessary based on severity of burn.</p>
Working with flammable gases such as hydrogen gas in use with hydrogenation apparatus	Ignition danger (particularly when mixed with oxidizing gases such as air); explosion; fire; splash damage if gas in solution as part of a reaction mixture.	<p>Nitrile gloves, lab coat, protective CSA-approved eye-wear; only use regulator specifically designed for hydrogen gas.</p> <p>Maintain pressure and flow as low as possible; make all effort to NOT expose hydrogen-filled vessels to air – flush vessel with nitrogen gas before releasing seal.</p> <p>Avoid releasing gas pressure near sources of ignition, e.g. flame, electrical contact, hot surface.</p>	<p>In case of cylinder leakage, if practical close valve on tank.</p> <p>Seek immediate medical and/or fire help via Dalhousie Security (4109/902-494-4109 if necessary). Shout to lab-mates for help.</p> <p>In case of fire when conducting a reaction or work-up, act immediately to remove sources of oxygen assuming it is safe to do so. e.g. place flat-bottom flask over flaming filter apparatus, or use sand to smother flame; when flame has extinguished, flush filter apparatus with inert gas such as nitrogen.</p>

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<p>Working with equipment under vacuum or pressure, e.g. glove-box, Dewars, rotary evaporator, distillation apparatus, heated sealed-vessels</p>	<p>Eye or skin damage in case of implosion or explosion.</p>	<p>Nitrile gloves, lab coat, protective CSA-approved eye-wear.</p> <p>Set-up and release vacuum and pressure slowly, checking for signs of leakage in system; wear lab coat, protective CSA-approved eye-wear, thick nitrile or rubber gloves; use blast shield for reactions conducted under pressure.</p> <p>Use blast shields for procedures in sealed vessels.</p> <p>Use tape or mesh around glass items under vacuum.</p>	<p>Seek immediate medical and/or fire help via Dalhousie Security (4109/902-494-4109 if necessary). Shout to lab-mates for help.</p> <p>Assess extent of spill and injury danger. Make decision whether to help others to evacuate the lab (close door, pull alarm, evacuate) or instigate clean up.</p> <p>Seek medical attention as necessary based on severity of injury.</p> <p>Instigate clean up as appropriate based on nature of spill.</p>
<p>Working with very cold equipment (e.g. cold probe, freezer, cold circulating bath, liquid nitrogen or dry ice)</p>	<p>Frostbite from touching cold liquids and surfaces.</p>	<p>Insulating gloves, lab coat, protective CSA-approved eye-wear.</p>	<p>Seek immediate medical and/or fire help via Dalhousie Security (4109/902-494-4109 if necessary). Shout to lab-mates for help.</p> <p>Remove affected area from cold surface and allow to reach room temperature; do not heat with hot water or other source of warmth beyond warm clothing.</p> <p>Seek medical help based on severity of injury.</p>
<p>Working with and transporting gas cylinders</p>	<p>Poisoning through inhalation or asphyxiation; fall and projectile hazard (injuries from impact, plus gas exposure and contamination).</p>	<p>Nitrile gloves, lab coat, protective CSA-approved eye-wear; cylinders should always be secured to wall or cart via belt/chain; do not store cylinders on a cart; all cylinders not in use and attached to regulator must be capped; all transportation of cylinders must be achieved using a cart designed for such purpose (carts are kept at ChemStores); when attaching regulator, always check for leaks using a soap/water solution.</p> <p>Use gases in a properly operating fume-hood with the sash low; use bubbler to monitor release flow at end of system.</p> <p>Use of gas cylinders in areas of poor ventilation can cause flash-backs; always use hydrogenation apparatus and hydrogen cylinder in well ventilated area.</p>	<p>Seek immediate medical and/or fire help via Dalhousie Security (4109/902-494-4109 if necessary). Shout to lab-mates for help.</p> <p>Assess extent of spill/leak and injury danger. Help others and evacuate lab in case of projectile and/ or large/toxic spill/leak. Contact Dalhousie Environmental Health and Safety Office for help regarding clean up and disposal.</p> <p>Seek medical attention as necessary based on severity of injury.</p>

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Working with airborne solids, e.g. silica	Inhalation of fine dust.	<p>Nitrile gloves, lab coat, protective CSA-approved eye-wear; always transfer solids in a properly functioning fume-hood with the sash low; store waste solids in closed vessel in fume-hood prior to disposal.</p> <p>To fill silica jars from barrel: use mask; use elastic bands to strap down long-sleeves on lab coat to make join with gloves; lift barrel into hood (seek help for lifting); ensure proper use of funnel to assist with transfer and minimize spillage.</p>	<p>Seek immediate medical and/or fire help via Dalhousie Security (4109/902-494-4109 if necessary). Shout to lab-mates for help.</p> <p>Assess extent of spill and injury danger. Contact Dalhousie Environmental Health and Safety Office for help regarding clean up and disposal.</p> <p>Seek medical attention as necessary based on severity of injury.</p> <p>Make all effort to keep dust inside fume-hood; use stiff card to gather together any spilled material; use paper towel to wipe up thin-layers/dust.</p>