|  |  |
| --- | --- |
| **Brueckner Lab-Specific Standard Operating Procedure (LSOP)**  **Rotary Evaporator** | |
| **Principal Investigator (PI):** Christian Brueckner | |
| **Building:** Chemistry | **Lab(s) Covered by LSOP:** R413/R415 |
| **Department:** Chemistry | **Lab Phone Number(s):** 6-6596/6-6598 |
| **SECTION 1 – HAZARDOUS CHEMICAL(S) or PROCESS(ES) and HAZARDS INVOLVED** | |
| * Vacuum, and the hazards associated with failing glass ware – cuts and lazerations * The rotary evaporator is an electrical machine with water cooling – this combination poses an electrocution risk * The rotary evaporator has a heated water bath that can reach temperatures up to 100°C and poses a risk of burns * Hazards associated with the chemicals in the flask * The rotary evaporator has parts that rotate rapidly and poses a risk of entanglement * The rotary evaporator is used to remove volatile solvents that are also flammable and poses a fire risk. * Other hazards associated with the solvents to be evaporated:   + Skin or eye irritation   + Skin defatting or dermatitis from prolonged or repeated skin exposure   + Central nervous system depression   + Reproductive and fetal effects   + Chronic toxic effects, such as liver or kidney effects, from inhalation of solvent vapors * Hazards associated with the cryogen dry ice – frost burns * Hazards associated with the coolant acetone – it is a flammable solvent * Mechanical hazards when operating a belt-driven vacuum pump | |
| **SECTION 2 – ADMINISTRATIVE CONTROLS** | |
| * Anyone using the chemicals and procedures described herein needs to have undergone the annual EH&S [Chemical Hygiene Training](http://www.ehs.uconn.edu/Chemical/?p=training) * Be aware of the applicable safety data sheets (MSDS) for the solvents/materials you are handling on the rotary evaporator: <http://www.msds.com> * [Working Alone](http://policy.uconn.edu/2012/07/30/working-alone-policy/) is not permitted when using chemicals or processes described in this LSOP | |
| **SECTION 3- ENGINEERING CONTROLS** | |
| Place rotary evaporator on even surface with facile access to power and vacuumThe exhaust of the vacuum pump should be venting into an exhaust systemPlace rotary evaporator in fume hood when particularly odorous or toxic compounds are being handledMake sure the electrical cords are in excellent condition | |

|  |
| --- |
| **SECTION 4 – WORK PRACTICES** |
| * The rotary evaporator has parts that rotate rapidly and poses a risk of entanglement – all hair, and other loose items of clothing or jewelry should be secured/out of the way before commencing. * A bump trap should be used with all evaporations * In general, use the highest vacuum and lowest temperature possible * Bump traps and round bottom flasks should be securely attached to apparatus - use of properly sized Keck clamps is recommended * Keep the dry ice trap filled with dry ice and acetone * Vacuum should be reduced/released immediately following a “bump” * The volume of solvent should not exceed half the volume of the flask or vial it is contained in * Bump traps should be cleaned prior to use * Use only distilled water to fill the heating bath and do not overfill the bath * Raise the jack of the rotavap as high as possible when inserting or removing a sample * Clean bump trap, empty collecting flask, and close the vacuum value after use * Make sure to not heat the bath for extended periods when the machine is not in use * Make sure the instrument is switched off at the end of the day * Become familiar with the maintenance of the rotary evaporator |
| **SECTION 5 – PERSONAL PROTECTIVE EQUIPMENT (PPE)** |
| * At a minimum, a lab coat, gloves, long pants, closed-toed footwear, and chemical safety glasses that meet ANSI standard Z-87.1 must be worn. |
| **SECTION 6 – STORAGE** |
| * When not in use: heating bath should be turned off, there should be no vacuum, and the slash trap and collecting flask should be empty. |
| **SECTION 7 – SPILL AND ACCIDENT PROCEDURES** |
| * Any solvent spill should be handled in the manner outlined in that chemicals safety data sheet or chemical hygiene plan. * Leave the room when spilling larger quantities of solvent * Activate the fire alarm and call **911** in case of a very large (>2000 mL) spill outside the fume hood * Turn off all sources of ignition – push the red emergency shut-off button near the exit. * Do not re-enter area until instructed to do so by an emergency personnel * Contaminated clothing should be removed to prevent prolonged exposure to irritant.   **Report any incident to the PI and fill out the** [**accident form**](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwiF3bPe1dPXAhVRRN8KHX4wDf4QFggmMAA&url=https%3A%2F%2Fchemistry.uconn.edu%2Fwp-content%2Fuploads%2Fsites%2F1259%2F2015%2F09%2FIncident-Report-Form.doc&usg=AOvVaw3Uov8IQ2Z-Kan) |
| **SECTION 8 – FIRST AID PROCEDURES** |
| * First Aid should be administered in a manner consistent with the spilled chemical’s safety data sheet * Immediately move to safety shower or other water source and begin rinsing affected area(s). Remove contaminated clothing (if applicable) while flushing   **Report any incident to the PI and fill out the** [**accident form**](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwiF3bPe1dPXAhVRRN8KHX4wDf4QFggmMAA&url=https%3A%2F%2Fchemistry.uconn.edu%2Fwp-content%2Fuploads%2Fsites%2F1259%2F2015%2F09%2FIncident-Report-Form.doc&usg=AOvVaw3Uov8IQ2Z-Kan) |
| **SECTION 9 – WASTE MANAGEMENT** |
| * Keep recycled, color- and odor-less methylene chloride/chloroform/methanol/ethanol in the bottles provided and use it as a washing solvent. Dispose of discolored or smelly solvents, or any solvent that might contain a hazardous substance (outside of the solvent itself) * All waste must be labeled with “Hazardous Waste” stickers or tags, use full chemical names to describe the waste (i.e., no chemical abbreviations or symbols), be stored in sturdy containers with tight-fitting caps or lids, and be stored alone or with other compatible chemicals * Hazardous wastes must be stored at or near a green “Satellite Accumulation Area” sign prior to disposal by EHS. Once the containers are 80% filled, fill our EH&S chemical [waste pickup form](http://ehs.uconn.edu/Regulated%20Waste%20Management/index.php) * The [Chemical Waste Disposal Manual](http://ehs.uconn.edu/Chemical/ChemWasteDisp.pdf) must be used as a reference |
| **SECTION 10 – DECONTAMINATION PROCEDURES** |
| * Collecting flask should be emptied and cleaned with acetone following a run * Bump traps should be cleaned with acetone following runs. * Become familiar with the maintenance of the rotary evaporator by asking more senior members in your research group and which part can be replaced/cleaned/decontaminated/degreased how |
| **SECTION 11 – SPECIFIC PROCEDURE** |
| A detailed procedure for the use of a rotary evaporated can be found in the link:  <http://sydney.edu.au/science/molecular_bioscience/ohs/documents/sop/SOP%20SMB_050.1_Using%20a%20rotory%20evaporator%20DF%20NS%200614.pdf> |

|  |  |  |  |
| --- | --- | --- | --- |
| **SECTION 12A. APPROVAL** | | | |
| I have reviewed, understand and agree to follow this lab-specific standard operating procedure (LSOP) for osmium tetroxide*.* Failure to follow this LSOP or lab-specific training guidelines is a violation of the [*University Health & Safety Policy*](http://policy.uconn.edu/2011/05/19/health-and-safety-policy/) and [*University Code of Conduct*](http://policy.uconn.edu/2011/05/17/employee-code-of-conduct/).  Further approval and/or review of this LSOP by the PI/Supervisor is required if any of the following events occur:   * A significant change in amount (i.e., doubling of the scale of reaction) or substitution of the chemicals in the procedure is planned * A major change in the agreed-upon experimental set-up is planned (heating instead of room temp, etc.) * Any signs of a failure in safety design or equipment are observed * Any signs or symptoms of a chemical exposure to any personnel are observed * Unexpected and/or potentially dangerous experimental results occur (e.g., fire, uncontrolled buildup of heat and/or pressure, etc.) | | | |
| **Researcher Name/Signature** | **Trainer Name/Signature** | **Training Date** | |
|  |  |  | |
|  |  |  | |
|  |  |  | |
|  |  |  | |
|  |  |  | |
|  |  |  | |
|  |  |  | |
|  |  |  | |
| **SECTION 12B. PRINCIPAL INVESTIGATOR CERTIFICATION** | | | |
| I approve the contents of the lab-specific standard operating procedure listed above. | | |
| **PI Signature:** | | **Date:** |
| **A HARD OR ELECTRONIC COPY (https://bruckner.research.uconn.edu/safety-resources/) OF EACH LAB-SPECIFIC STANDARD OPERATING PROCEDURE MUST BE READILY AVAILBALE IN THE LAB.** | | |