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| **Brueckner Lab-Specific Standard Operating Procedure (LSOP)** **Flammable Solvents** |
| **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** |
| Methanol, Ethanol, *i*-Propanol, Butanol* + Flammable.
	+ Skin, eye, and respiratory irritant.
	+ Skin sensitizer.
	+ Mutagenic to mammalian somatic cells.
	+ May be toxic to blood, kidneys, liver, brain, and nervous systems.
	+ Repeated or prolonged exposure to the substance can produce target organs damage.

Acetone* + Flammable
	+ Skin, eye, and respiratory irritant.
	+ The substance is toxic to central nervous system (CNS).
	+ The substance may be toxic to kidneys, the reproductive system, liver, skin.
	+ Repeated or prolonged exposure to the substance can produce target organs damage.

Toluene* + Flammable.
	+ Hazardous in case of skin contact (irritant, permeator), eye contact (irritant), ingestion, inhalation.
	+ The substance may be toxic to blood, kidneys, the nervous system, liver, brain, and CNS.
	+ Repeated or prolonged exposure to the substance can produce target organs damage.

Dimethylsulfoxide (DMSO)* + Flammable.
	+ Slightly hazardous in case of inhalation (lung irritant), skin contact (irritant, permeator), of eye contact (irritant), of ingestion.
	+ The substance may be toxic to blood, kidneys, liver, mucous membranes, skin, eyes.
	+ Repeated or prolonged exposure to the substance can produce target organs damage.

Tetrahydrofuran (THF)* + Flammable.
	+ Hazardous in case of skin contact (irritant), of eye contact (irritant).
	+ Slightly hazardous in case of skin contact (permeator), of ingestion, of inhalation.
	+ The substance may be toxic to blood, kidneys, lungs, liver, upper respiratory tract, skin, eyes, and CNS.
	+ Repeated or prolonged exposure to the substance can produce target organs damage.

Diethyl ether* + Flammable.
	+ Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.
	+ Slightly hazardous in case of skin contact (permeator).
	+ The substance may be toxic to skin, and CNS.Repeated or prolonged exposure to the substance can produce target organs damage.

Ethyl Acetate* + Flammable.
	+ Hazardous in case of ingestion, of inhalation.
	+ Slightly hazardous in case of skin contact (irritant, permeator), of eye contact (irritant).
	+ The substance is toxic to mucous membranes, upper respiratory tract.
	+ The substance may be toxic to blood, kidneys, liver, and CNS.
	+ Repeated or prolonged exposure to the substance can produce target organs damage.

Triethylamine* + Flammable
	+ Very hazardous in case of eye contact (irritant).
	+ Hazardous in case of skin contact (irritant) or inhalation.
	+ Slightly hazardous in case of ingestion.
	+ Inflammation of the eye is characterized by redness, watering, and itching.
	+ The substance is toxic to kidneys, liver.

Hexane(s)* + Flammable.
	+ Hazardous in case of skin contact (permeator), ingestion, or inhalation.
	+ Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).
	+ The substance may be toxic to peripheral nervous system, skin, and CNS.
	+ Repeated or prolonged exposure to the substance can produce target organs damage.
* Pyridine
	+ Flammable.
	+ Hazardous in case of skin contact (irritant, permeator), eye contact (irritant), ingestion, inhalation.
	+ The substance may be toxic to blood, kidneys, liver, mucous membranes, peripheral nervous system, eyes, and CNS.
	+ Repeated or prolonged exposure to the substance can produce target organs damage.

Dimethylformamide (DMF)* + Flammable.
	+ Skin, eye, and respiratory irritant.
	+ Skin permeator.
	+ Mutagenic to mammalian somatic cells.
	+ Reproductive toxin.
	+ Toxic to kidney, liver, and CNS.
	+ Repeated or prolonged exposure to the substance can produce target organs damage.
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| **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): <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.
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| **SECTION 3- ENGINEERING CONTROLS** |
| * All research with flammable solvents should be conducted in a chemical fume hood, with the sash at the lowest working height and with sliding sash panels aligned to form a barrier between the researcher and the experiment.
* Chemical fume hoods must have been tested by EHS within the last year. If the hood is not working properly, contact Facilities (486-3113) to repair the hood or EH&S to retest (486-3613).
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| **SECTION 4 – WORK PRACTICES** |
| * In general, all listed solvents should be handled in the hood.
* Do not keep bottles on the floor.
* Keep the flammable cabinets shut.
* Keep only the minimal amounts of the flammable solvents on your bench.
* Keep them tightly shut of not in use.

All containers must be clearly labeled with the chemical name and hazard classes and kept tightly-sealed.* Empty containers of solvents must be handled carefully since product residues may still be harmful: Leave all contaminated glassware in the fume hood to vent/dry out.
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| **SECTION 5 – PERSONAL PROTECTIVE EQUIPMENT (PPE)** |
| * At a minimum, a lab coat, long pants as well as closed-toed footwear and chemical safety glasses that meet American National Standards Institute (ANSI) standard Z-87.1 must be worn when handling any of the solvents.
* Check your type of gloves against a glove selection guide: https://www.coleparmer.com/safety-glove-chemical-compatibility.
* Chemical splash goggles and a rubber apron are recommended when handling large quantities of the solvents.
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| **SECTION 6 – STORAGE** |
| * Methanol, Ethyl Acetate, Hexanes, Dimethylformamide, Acetone, Toluene, Dimethyl Sulfoxide, Tetrahydrofuran, Diethyl Ether; Keep in a tightly sealed container within the flammables cabinets.
* Triethylamine, Pyridine; Keep in a tightly sealed container within the Bases/Amines cabinet.
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| **SECTION 7 – SPILL AND ACCIDENT PROCEDURES** |
| * Methanol, Ethyl Acetate, Pyridine, Dimethylformamide, Acetone, Dimethyl Sulfoxide, Tetrahydrofuran, Diethyl Ether
	+ Dilute with water and mop up.
	+ Absorb with an inert material and dispose is the proper waste disposal.
* Triethylamine
	+ Dilute with water and mop up.
	+ If necessary, neutralize the residue with a dilute solution of acetic acid and finish by spreading water on the contaminated area.
* Hexane, Toluene
	+ Absorb with an inert material and dispose is the proper waste disposal.
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| **SECTION 8 – FIRST AID PROCEDURES** |
| *Eyes** Immediately move to the eyewash station, hold eyelids open and flush with water. Remove contact lenses while flushing (if applicable)
* Have another person from the lab dial **911** and mention specific solvent involved
* Continue flushing the eyes until emergency personnel arrives

*Skin** Immediately move to safety shower and begin rinsing affected area(s). Remove contaminated clothing (if applicable) while flushing.
* You may use the safety shower in the washrooms, but never alone in an emergency situation
* Have another person from the lab dial **911** if intense skin irritation is observed and mention specific solvent involved

*Ingestion** Immediately rinse the mouth with cold water
* Do NOT induce vomiting
* Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband.
* Have another person from the lab dial **911** and specifically mention specific solvent involved
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| **SECTION 9 – WASTE MANAGEMENT** |
| * 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
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| **SECTION 10 – DECONTAMINATION PROCEDURES** |
| N/A |
| **SECTION 11 – SPECIFIC PROCEDURE** |
| N/A |

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|  | **SECTION 12A. APPROVAL** |
| I have reviewed, understand and agree to follow this lab-specific standard operating procedure (LSOP)*.* 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.)
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| **Researcher Name/Signature** | **Trainer Name/Signature** | **Training Date** |
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|  | **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.** |