

# University of Wisconsin-Madison Laboratory Chemical Hygiene Plan

For

Wright Group

## Certification and Annual Review and Updates

By signing and dating here, the Laboratory Chemical Hygiene Officer and Principal Investigator certify that this Laboratory-Specific Chemical Hygiene Documentation is accurate and that it effectively provides for the chemical safety of employees and students in this laboratory.

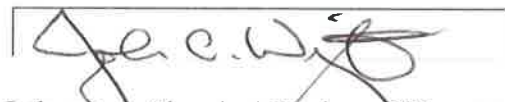
Principal Investigator:

John C. Wright

Signature

Printed Name

Date



John C. Wright

Laboratory Chemical Hygiene Officer (if other than PI):

Dan Kohler

Signature

Printed Name

Date



Dan Kohler

3/19/12

By signing and dating here, the Laboratory Chemical Hygiene Officer certifies that the required annual review (and update, if needed) of the Laboratory-Specific Chemical Hygiene Documentation has been completed, and that this document continues to be accurate and to effectively provide for the chemical safety of employees in this laboratory.

Reviewed by:

Review Date:

Reviewed by:

Review Date:

Reviewed by:

Review Date:

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## Section 1: Personnel

### 1.1 Safety Personnel

*List the names of key safety personnel. In addition to indicating the individual in charge of the laboratory (i.e. the P.I. or lab manager) and the Laboratory Chemical Hygiene Officer the names of key staff such as building manager or other important individuals should be included.*

Name	Position	Phone
John C. Wright	Principal Investigator	262-0351
Jeffrey Zebrowski	University Chemical Hygiene Officer	890-0993
UWPD Dispatch	Emergency	911
UWPD Dispatch	Non-Emergency (UWPD has access to EH&S pager for off-hour situations.)	264-2677

### 1.2 Laboratory Staff/Students

*List all individuals who work with hazardous chemicals in the labs and are therefore subject to this plan.*

Name	Name	Name
John C. Wright	Dan Kholer	Erin Boyle
Schuyler (Skye) Kain	Andrei Pakoulev	Stephen Block
Paul Herbert	Blaise Thompson	Matt Rowley
Eric Hagee		

## Section 2: Laboratory Room Locations

*List all rooms in which use of hazardous chemicals will occur:*

Building	Room	Room Assigned to the PI (Y/N)	Shared Facility (Y/N)
Chemistry (Matthews)	3211	Y	N
Chemistry (Matthews)	3208	Y	N

### Section 3: Laboratory-Specific Policies

*The Campus CHP plan outlines university policies related to the laboratory use and storage of hazardous chemicals. Principal Investigators may implement their own policies for the laboratories under their control (as long as they are consistent with University policy). Section 3 provides a section to document these laboratory-specific policies. Some examples may include "No working alone after 10:00 pm" or "Lab coats must be worn at all times in the lab regardless of whether work is being performed".*

*Include below all laboratory specific policies instituted by the Principle Investigator (e.g., eye protection must be worn in the lab at all times, no working alone, etc.). This space provides the opportunity to place in one location and document the lab's safety policies related to the use of hazardous chemicals.*

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The Wright group is primarily a laser spectroscopy group, with minimal chemical synthesis / wet lab work. For general chemical safety concerns, we defer to the procedures detailed in the **Laboratory Safety Guide** put out by the Chemical and Radiation Protection Office, University of Wisconsin Madison. Safety concerns of specific relevance to our work are listed below.

#### Laser Lab Safety

1. Never look at a laser beam directly. Even proper eye protection may not be able to protect against a direct beam.
2. Do not wear watches, jewelry etc. while working on the laser table. Uncontrolled specular reflection off of such objects can be dangerous for you and those working around you.
3. When practical, use beam blocks or cards to block light while adjusting optics. If you must adjust an optic while the beam is on, make sure that the optic is well secured and that your adjustments will not cause any dangerous or uncontrolled reflections. Keep laser power as low as practical when making adjustments.
4. Keep light levels in the room as high as practical.
5. When viewing a spot with an optical instrument use thought and caution.
6. Beams should not be at eye height. Do not bend down and look along the plane of the beam.
7. Keep all optics on the table secured. Do not store stock optics near active experiments.
8. Be aware of the location of high voltage power supplies in lab. Keep chemicals and clutter away from high voltage areas. If possible, cut power to high voltage electronics before beginning work. Use only one hand when working on or around high voltage electronics. Dangerous voltages in the laser should be covered and inaccessible.

9. Properly ground laser components. Use interlocks when prudent. Check these and other safety features regularly.
10. Wear safety glasses with sufficient optical density at all times in lab. Be especially careful to use proper eye protection when working within laser cavities.
11. Food and drink *are* allowed in the laser lab at the user's discretion.
12. Chemicals and samples should be stored in areas away from workstations to minimize exposure.
13. Be aware of fire hazards in lab. Fires may start at random times and spread quickly. Keep flammable materials away from lasers (out of the laser lab if practical). Dark cloth (used to insulate systems from outside light), and cards used to temporarily block beams are common fire starters.
14. Unnecessary personnel should not enter the laser lab. People not involved with the experiment should not be present. Warning signs should be posted on every door to the lab.

#### Other

1. When getting liquid nitrogen, use the supplied gloves and goggles. Always keep the door open while the liquid nitrogen is dispensing.

#### Section 4: Laboratory SOPs – Procedure Form

**Title of Procedure:**

**Principal Investigator (PI):**

**Prepared By:**

**Revision Date:**

**Prior Approval:** This procedure is considered hazardous enough that prior approval is needed from the Principal Investigator: ☐ Y ☒ N

**Involves Use of Particularly Hazardous Substance (PHS)?** ☐ Y ☒ N

Carcinogen      Reproductive Toxin      High Acute Toxicity

Does this procedure require medical surveillance? ☐ Y ☒ N

Does this require use of a fit-tested respirator? ☐ Y ☒ N

**Brief Description of Procedure (100 words or less):**

Quantum dot precursors are injected into a hot (~180 deg C) solution.

**Location:** List the locations (buildings/rooms) where this procedure may be performed. For use of a PHS indicate a more precise location within the room, if appropriate, as the designated area.

Chem 3211 (wet lab)

**Chemicals Involved:**

Chemical	Physical or Health Hazard (e.g., carcinogen, corrosive)
Trioctylphosphene (TOP)	corrosive
Lead Acetate	toxic
Selenide	toxic
Diphenyl Ether	irritant, permeator

**Other Hazards:** Include other hazards, other than chemical, that may be present during operation of the procedure.

n/a

**Exposure Controls:** (check all that apply)

**PPE:** ☒ Safety Glasses      ☐ Face shield      ☒ Chemical Splash Goggles

☐ Chemical apron      ☒ Gloves (type):

☒ Lab coat      ☐ Respirator (type):

☐ Other

**Engineering Control:**

☒ Fume hood      ☐ Biosafety cabinet      ☐ Glove box      ☐ Vented gas cabinet

☐ Other (include controls as pressure relief valves, intrinsically safe hot plates, automatic shut-offs):

**Administrative Controls:** *List any specific work practices needed to perform this procedure (e.g., cannot be performed alone, must notify other staff members before beginning, etc.).*

n/a

**Task Hazard Control Table:** *For procedures involving numerous steps it may be convenient to indicate specific requirements for individual tasks in the table below:*

Task	Required PPE and/or Engineering Controls

**Waste Disposal:** *Describe any chemical waste generated and the disposal method used.*

Heat spike induces pyrolysis; waste into organic waste container.

**Accidental Spills:** *Describe procedure for handling small chemical spills that may occur during this procedure. Note that for large spills it may be appropriate to call 911.*

Immediately turn off TCU & remove from the spill area.

**Decontamination Procedures (required for PHS use):** *Describe the procedure for decontamination of personnel and equipment.*

n/a

**Training:** *Describe any training needed prior to performing this procedure. Include training performed in-lab and any required demonstrations of competency.*

See Dan and be shown how to do synthesis prior to attempting.

**Principal Investigator Approval:** I have reviewed this procedure and approved it for use. Note: Modifications to the procedure may require update to this form.

John C. Wright

Name

Signature

Date

### Section 5: Orientation Checklist:

*A checklist for all laboratory personnel listed in Section 1 must be filled out.*

**As part of my orientation with the laboratory operation I have read and am familiar with the contents (and location) of:**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> The OSHA Laboratory Standard                  | <input checked="" type="checkbox"/> The UW-Madison Campus CHP |
| <input checked="" type="checkbox"/> The UW-Madison <i>Laboratory Safety Guide</i> | <input checked="" type="checkbox"/> The Laboratory CHP        |
| <input checked="" type="checkbox"/> MSDSs for lab chemicals                       |   |

#### **I have been instructed on:**

- ☒ The chemical hazards in the lab    ☒ Laboratory-specific policies
- ☒ The relevant exposure limits [PELs (OSHA), TLVs (ACGIH), etc.]
- ☒ The signs and symptoms associated with exposures to hazardous chemicals used in the lab
- ☒ The physical hazards of the laboratory (heat, electrical, mechanical, etc.)

#### **Reviewed the laboratories emergency procedures, including:**

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Emergency phone numbers                        | <input checked="" type="checkbox"/> Procedures for uncontrolled releases |
| <input checked="" type="checkbox"/> Evacuation routes                              | <input checked="" type="checkbox"/> Safety equipment failure procedures  |
| <input checked="" type="checkbox"/> Review location and use of chemical spill kits |  |
| <input checked="" type="checkbox"/> Laboratory exhaust failure procedure           |  |

The location of emergency equipment:

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Fire extinguishers | <input checked="" type="checkbox"/> Eye wash stations  |
| <input checked="" type="checkbox"/> Safety showers     | <input checked="" type="checkbox"/> First-aid supplies |

#### **I have been made familiar with routine operations of the laboratory, including:**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Lab cleaning and maintenance rules    | <input checked="" type="checkbox"/> Waste handling procedures             |
| <input checked="" type="checkbox"/> Proper use of PPE                     | <input checked="" type="checkbox"/> Chemical procurement practices        |
| <input checked="" type="checkbox"/> Chemical storage policies for the lab | <input checked="" type="checkbox"/> The proper use of chemical fume hoods |

**In addition, I have been made familiar with the following lab-specific health and safety features and safety resources:**

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

**I have completed orientation of all the above items**

Name: Stephen Block

Date: 2/10/12

Signature: Stephen Block

PI (or Lab CHO) Signature:

Dr. Kim



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<input type="checkbox"/>	<input type="checkbox"/>
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**I have completed orientation of all the above items**

Name: Blaise Thompson

Date: 2/9/12

Signature: 

PI (or Lab CHO) Signature: 

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<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

**I have completed orientation of all the above items**

Name: Eric J. Hagee

Date: 03/15/12

Signature: Eric J. Hagee

PI (or Lab CHO) Signature: Dan Khan

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| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

**I have completed orientation of all the above items**

Name: Schuyler Kain

Date: 03/15/12

Signature: Schuyler Kain

PI (or Lab CHO) Signature:

Dan Kain

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| <input type="checkbox"/> | <input type="checkbox"/> |

**I have completed orientation of all the above items**

Name: Erin Boyle

Date: 2/9/12

Signature: [Signature]

PI (or Lab CHO) Signature:

[Signature]

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| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

**I have completed orientation of all the above items**

Name: *Andre Pakoulev*

Date: *02-09-12*

Signature:

*[Handwritten Signature]*

PI (or Lab CHO) Signature:

*[Handwritten Signature]*



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**I have completed orientation of all the above items**

Name: Dan Kohler

Signature: DAN KOHLER

Date: 2/9/12

PI (or Lab CHO) Signature:

Dan Kohler

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| <input checked="" type="checkbox"/> The relevant exposure limits [PELs (OSHA), TLVs (ACGIH), etc.]                          |  |
| <input checked="" type="checkbox"/> The signs and symptoms associated with exposures to hazardous chemicals used in the lab |  |
| <input checked="" type="checkbox"/> The physical hazards of the laboratory (heat, electrical, mechanical, etc.)             |  |

**Reviewed the laboratories emergency procedures, including:**

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Emergency phone numbers                        | <input checked="" type="checkbox"/> Procedures for uncontrolled releases |
| <input checked="" type="checkbox"/> Evacuation routes                              | <input checked="" type="checkbox"/> Safety equipment failure procedures  |
| <input checked="" type="checkbox"/> Review location and use of chemical spill kits |  |
| <input checked="" type="checkbox"/> Laboratory exhaust failure procedure           |  |
| The location of emergency equipment:   |  |
| <input checked="" type="checkbox"/> Fire extinguishers                             | <input checked="" type="checkbox"/> Eye wash stations                    |
| <input checked="" type="checkbox"/> Safety showers                                 | <input checked="" type="checkbox"/> First-aid supplies                   |

**I have been made familiar with routine operations of the laboratory, including:**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Lab cleaning and maintenance rules    | <input checked="" type="checkbox"/> Waste handling procedures             |
| <input checked="" type="checkbox"/> Proper use of PPE                     | <input checked="" type="checkbox"/> Chemical procurement practices        |
| <input checked="" type="checkbox"/> Chemical storage policies for the lab | <input checked="" type="checkbox"/> The proper use of chemical fume hoods |

**In addition, I have been made familiar with the following lab-specific health and safety features and safety resources:**

- |                          |                          |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

**I have completed orientation of all the above items**

Name: Paul Hebert

Date: 2/10/2012

Signature: 

PI (or Lab CHO) Signature:



### Section 5: Orientation Checklist:

*A checklist for all laboratory personnel listed in Section 1 must be filled out.*

**As part of my orientation with the laboratory operation I have read and am familiar with the contents (and location) of:**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> The OSHA Laboratory Standard                  | <input checked="" type="checkbox"/> The UW-Madison Campus CHP |
| <input checked="" type="checkbox"/> The UW-Madison <i>Laboratory Safety Guide</i> | <input checked="" type="checkbox"/> The Laboratory CHP        |
| <input checked="" type="checkbox"/> MSDSs for lab chemicals                       |   |

**I have been instructed on:**

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> The chemical hazards in the lab   | <input checked="" type="checkbox"/> Laboratory-specific policies |
| <input checked="" type="checkbox"/> The relevant exposure limits [PELs (OSHA), TLVs (ACGIH), etc.]                          |  |
| <input checked="" type="checkbox"/> The signs and symptoms associated with exposures to hazardous chemicals used in the lab |  |
| <input checked="" type="checkbox"/> The physical hazards of the laboratory (heat, electrical, mechanical, etc.)             |  |

**Reviewed the laboratories emergency procedures, including:**

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> Emergency phone numbers                        | <input checked="" type="checkbox"/> Procedures for uncontrolled releases |
| <input checked="" type="checkbox"/> Evacuation routes                              | <input checked="" type="checkbox"/> Safety equipment failure procedures  |
| <input checked="" type="checkbox"/> Review location and use of chemical spill kits |  |
| <input checked="" type="checkbox"/> Laboratory exhaust failure procedure           |  |
| The location of emergency equipment:   |  |
| <input checked="" type="checkbox"/> Fire extinguishers                             | <input checked="" type="checkbox"/> Eye wash stations                    |
| <input checked="" type="checkbox"/> Safety showers                                 | <input checked="" type="checkbox"/> First-aid supplies                   |

**I have been made familiar with routine operations of the laboratory, including:**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Lab cleaning and maintenance rules    | <input checked="" type="checkbox"/> Waste handling procedures             |
| <input checked="" type="checkbox"/> Proper use of PPE                     | <input checked="" type="checkbox"/> Chemical procurement practices        |
| <input checked="" type="checkbox"/> Chemical storage policies for the lab | <input checked="" type="checkbox"/> The proper use of chemical fume hoods |

**In addition, I have been made familiar with the following lab-specific health and safety features and safety resources:**

<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

**I have completed orientation of all the above items**

Name: Matthew Rowley

Date: 3/14/2012

Signature: 

PI (or Lab CHO) Signature:





## Section 6: Laboratory Safety Training

### Master List of Required Training

*List the training required in order to work with hazardous chemicals in your laboratory. This list should include training provided by the university, outside sources, and hands-on training of tasks and procedures provided in-lab. It is understood that the training below does not apply to all students or staff but will be based on each individual's work assignments.*

Training Title	Description/Purpose

**Section 6: Laboratory Safety Training**  
**Documentation of Training**

*Track required training using the table below. A separate sheet should be used for each training course and/or training session.*

**Title of Training:** \_\_\_\_\_  
**Training Performed by:** \_\_\_\_\_  
**Description of Training:** \_\_\_\_\_

Name (print)	Signature	Date



## Section 7: Prior Approvals

*This section of the lab-specific CHP allows the PI to document approval for individuals to perform specific Standard Operating Procedures (as indicated in the SOP description).*

**Standard Operating Procedure Title:**

[illegible]

## Section 8: MSDSs and Inventory of Hazardous Chemicals

*A number of regulations require that Material Safety Data Sheets (MSDSs) be maintained and readily accessible for all hazardous chemicals. The Campus Chemical Hygiene Plan also requires that inventories be maintained for a certain categories of hazardous chemicals above specified amounts (see Section 6.3 of the Campus CHP). Provide a description of where the MSDSs are stored and how inventory records are maintained.*

### Material Safety Data Sheets

Location of MSDSs:

This binder

Format of MSDS (electronic, hard copy, etc):

Hard copy

### Chemical Inventory

Method of Maintaining Inventory:

Table found in this binder

Location of Inventory Records:

This binder

## Section 8: Inventory of Hazardous Chemicals

Chemical Name	Storage Location	Approximate Amount Stored
Tellurium Salts	Jin group glove box	<25 grams
Selenide Salts	Jin group glove box	<25 grams
Cadmium Salts	Wet-lab shelf by the window	<25 grams
Lead Salts	Wet-lab shelf by the window	<25 grams
Carbon Tetrachloride	Jin group glove box, organic solvent cabinet	4 liters
Trichloromethane	Organic solvent cabinet	2 liters
Dichloromethane	Organic solvent cabinet	500 ml
Chloromethane	Organic solvent cabinet	<500 ml
Diphenyl Ether	Organic solvent cabinet	2 kg
Tri-octyl Phosphene	Jin group glove box	<25 grams