

# Standard Operating Procedure

## NITROUS OXIDE

*This SOP is not complete until it has been signed and dated by the PI and relevant lab personnel.*

Print a copy and insert into your  
*Laboratory Safety Manual and Chemical Hygiene Plan.*  
Refer to instructions for assistance.

<b>Department:</b>	Chemistry & Biochemistry – Chemical Engineering
<b>Date SOP was written:</b>	December 14, 2012
<b>Date SOP was approved by PI/lab supervisor:</b>	January 18, 2013
<b>SOP reviewed by:</b>	Alessandro Moretto, Chem. Lab. Safety Officer
<b>Principal Investigator:</b>	Prof. Susannah Scott
<b>Internal Lab Safety Coordinator/Lab Manager:</b>	Stephanie Goubert-Renaudin
<b>Lab Phone:</b>	805-893-8941
<b>Office Phone:</b>	805-893-7403
<b>Emergency Contact:</b>	EH&S 24 hour line: 805-893-3194
<b>Locations covered by this SOP</b>	ESB 3324 and 3328

**Type of SOP:**     Process             Hazardous Chemical             Hazardous Class

### Purpose

Nitrous oxide, commonly known as laughing gas, it is a colorless, non-flammable gas, with a slightly sweet odor and taste. It is used in surgery and dentistry for its anesthetic and analgesic effects. In the Laboratory, Nitrous oxide is used for oxidation chemistry in flow reactors. It is listed in the human reproductive toxins according to California Proposition 65.

### Physical & Chemical Properties/Definition of Chemical Group

CAS#: 10024-97-2

Class: **oxidizer**

Molecular Formula: N<sub>2</sub>O

Form (physical state): Colorless gas

Boiling point: -126.4°F (-88°C)

### Potential Hazards/Toxicity

- Inhalation: Acts as a simple asphyxiant when concentrated.

### Engineering Controls

Use only with adequate ventilation.

### Personal Protective Equipment (PPE)

As a general practice when working in the laboratory, a labcoat, safety goggles and gloves have to be worn.

### First Aid Procedures

#### If inhaled

Immediately remove to fresh air. If not breathing, give artificial respiration. Call a physician

### Special Handling and Storage Requirements

High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Store in tightly-closed container. Avoid contact with combustible materials. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Keep container tightly closed. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over.

### Accident: Dial **9-911** and EH&S (805-893-3194)

### Medical Emergency Dial **9-911**

**Life Threatening Emergency, After Hours, Weekends and Holidays** – Dial **9-911** (or 805-893-3446 from a cell phone) or go to the Emergency Room of Goleta Valley Cottage Hospital at 351 South Patterson Avenue, Goleta (Phone number: 805-967-3411) *Note: All Serious injuries must be reported to EH&S within 8 hours.*

**Non-Life Threatening Emergency** – Go to the Student Health Building, Building 588 (phone number: 893-5361, hours: M, T, R, F 8am-4.30pm, W 9am - 4.30pm, R 5pm to 7pm by appointment). After hours go to the Emergency Room of Goleta Valley Cottage Hospital at 351 South Patterson Avenue, Goleta (Phone number: 805-967-3411) *Note: All serious injuries must be reported to EH&S within 8 hours.*

### Decontamination/Waste Disposal Procedure

When the nitrous oxide compressed gas cylinder's pressure is too low, remove any attachments from the valve, cap the cylinder, and mark "empty" on the cylinder. Return the cylinder to the distributor.

### Safety Data Sheet (SDS) Location

Online SDS can be accessed at <http://ehs.ucsb.edu/units/labsfty/labrsc/chemistry/lchemmsds.htm>

## Protocol/Procedure

Nitrous oxide is used in the catlab plug flow reactor and as an oxidant in other reactions.

The cylinder should always be securely fastened so that it cannot fall over. Avoid ignition sources. The regulator and all fittings and connections must be leak checked with snoop (soapy water). Snoop (soapy water) will bubble if there is a gas leak; tighten the fittings if there is a leak. All users should be familiar with attaching regulators, fittings, and leak checking connections or they should be accompanied by someone with experience. All vents are securely connected to the main exhaust lines to prevent gas exposure in the laboratory.

The outlet of the regulator is typically maintained at pressures near 40 psi.

When the cylinder is empty, the cylinder should be labeled and returned to the distributor.

**NOTE: Any deviation from this SOP requires approval from PI.**

## Documentation of Training (signature of all users is required)

- Prior to conducting any work with nitrous oxide, designated personnel, i.e. approved users listed below, must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
- The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and a copy of the SDS provided by the manufacturer.
- The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training as required by EH&S.

I have read and understand the content of this SOP:

Name	Signature	Trainer	Date
Prof. Susannah Scott			
Stephanie Goubert-Renaudin			
Gary Kwanyi Ng			
Alessandro Gallo			
Anthony Crisci			
Haibo Yu			
Taeho Hwang			

Bethany Wigington			
Daniel Coller			
Zachary Jones			
Youhong Wang			
Jinghong Zhou			
Jason Fendi			

