
Safety Data Sheets (SDS)

Internet Research Activity

Instructor Guide

Note to Instructor

Safety Data Sheet – Internet Research is the generic activity for the SDS Learning Module. This activity could be assigned either before or after the primary knowledge unit on SDSs.

If assigned before the primary knowledge (PK) unit, it is recommended that the participant complete Step 1 ONLY of the procedure, then complete the PK. After completion of the PK, the participant can then complete the rest of the procedure in this activity. This process would allow the participant some *discovery* of the information needed to effectively complete this activity; therefore, the participant would better understand the relevance of the information in the PK to this activity.

Other units in the SDS Learning Module:

- SDS Knowledge Probe
- SDS Primary Knowledge
- **SDS Internet Research Activity**
- SDS Activity for KOH
- SDS Activity Assessment for KOH
- SDS Final Assessment

For more safety learning module and more modules related to microtechnology, visit the SCME website (<http://scme-nm.org>).

Description and Estimated Time to Complete

This is a research activity to locate specific Safety Data Sheets (SDS) that are relevant to microsystems fabrication. Such SDSs can be located at various sites on Internet. From these SDSs, you will extract specific information and interpret that information for its relevance to maintaining your safety and the safety of fellow employees in the workplace.

This activity allows you to demonstrate your ability to locate a SDS and interpret the information found within it.

Estimated time to complete:

Allow at least 2 hours



Chemical Safety LLC

Product and Company Information

Boron Trichloride

Product ID: Boron Trichloride

Date of SDS: 01/10/2014

Technical Review Date: 08/1/2014

Manufacturer: Chemical Safety LLC

555 Our Chemical St.

Safety, NC 00099-3333

Emergency Phone #: (111) 000-2222

Trade Names/Synonyms: BCL3, Boron Chloride, TriChloroboron

Chemical Family: non-metallic, halides

Introduction

In order to work safely in a facility that fabricates MEMS devices, you must understand the purpose of a SDS and how to extract information about various chemicals. Such facilities use many hazardous materials that could be harmful to your health and the environment if not handled properly or if the required safety measures are not followed.

A Safety Data Sheet (SDS) contains information on the hazards associated with a particular chemical, handling information, emergency procedures for spills or human contact, and data associated with its flammability and reactivity. Before storing, handling or working with a chemical in any manner, you should become familiar with the information provided in the chemical's SDS.

Dependencies

Knowledge of the terminology and acronyms associated with hazardous materials would be beneficial. Such terms can be found in the SDS HyperGlossary (<http://www.ilpi.com/msds/ref/index.html>).

Resource: SCME [Safety Data Sheets PK](#)



Chemical
Safety LLC

Safety Data Sheet – BCL3

Hazard(s) Identification
NFPA Ratings: Health 3 Fire 0 Reactivity 2
Color: colorless
Physical Form: fuming liquid, gas
Odor: pungent odor
May cause respiratory tract burns, skin burns, eye burns, mucous membrane burns.
Containers may rupture or explode if exposed to heat.
Releases toxic, corrosive, flammable or explosive gas

Documentation

Create a written report documenting the information collected for this activity. Your report should include the following:

- The information extracted for each step of the procedure
- Explanations and justifications when required
- Post-Activity Questions with answers

SDS Internet Research

When you are working with chemicals, it is important that you know how to locate a SDS, extract information from it, understand the meaning of the information extracted, and know how to use the information.

Description

Use the Internet to locate the required SDS's and information for the following chemicals.

SDS for HexaMethylDiSilazane (HMDS)

Extract the following information:

- SDS Source (Manufacturer and URL)
- Ingredients and respective percents (%)
- Primary health hazard(s)
- Chemical characteristic(s)
- First aid measures for eye contact with HMDS
- First responder's responsibility to an HMDS fire
- Flashpoint temperature
- Toxicity limits
- Safety procedure for filling an HMDS bottle at the equipment. *(Write in your own words)*

SDS for Hydrofluoric Acid

Extract the following information:

- SDS Source (Manufacturer and URL)
- Ingredients and respective percents (%)
- First responder's responsibility to a co-worker being splashed with HF
- Effects of HF when mixed with water
- Required PPE when working with HF
- Flammability characteristics
- Safety procedure for working with any concentration of HF *(Write in your own words)*

SDS for TetraMethylAmmoniumHydroxide (TMAH)

Extract the following information:

- SDS Source (Manufacturer and URL)
- Ingredients and percents (%)
- Chemical characteristics (i.e. corrosive, poison, mutagen, etc.)
- Flammability characteristics
- Physical properties of TMAH
- Procedure for responding to a possible TMAH spill (*Write in your own words*)

Comparison of the three SDSs

Using the three SDSs from the previous steps, complete the following table. Indicate with a check mark which characteristic applies to which chemical(s).

| Characteristics | HMDS | HF | TMAH |
|-------------------------|-------------|-----------|-------------|
| Carcinogen | | | |
| Flammable | | | |
| Poison | | | |
| Strong acid | | | |
| Strong base | | | |
| Flashpoint > 200 C | | | |
| Reactive with water | | | |
| Soluble in water | | | |
| Requires safety glasses | | | |

Table 1: SDS Comparison

Post-Activity Questions

1. What does SDS stand for?
2. List ten (10) requirements for a SDS.
3. Under which section would one find the flashpoint for a chemical? What happens when a chemical reaches its flashpoint?
4. Under which section would one find the maximum amount of concentration of a chemical that a worker may be exposed to under OSHA regulations? What is this called?
5. Under which section would one find a chemical's ability to be mixed with water or other chemicals?
6. In what fabrication process is HMDS used in microsystems manufacturing?
7. What is an application of HF in microsystems fabrication?
8. Where is TMAH used in microsystems fabrication?

Final Documentation

Create a written report documenting the information collected for this activity.

Your report should include the following:

- The information extracted for each step of the procedure
- Explanations and justifications when required
- Post-Activity Questions with answers

Post-Activity Questions with Answers

1. What does SDS stand for?
Safety Data Sheet
2. List ten (10) requirements for a SDS.
List should include 10 of the 16 required sections
3. Under which section would one find the flashpoint for a chemical?
Fire / Explosion Hazard and/or Physical / Chemical properties
When a chemical reaches its flashpoint its vapor forms an ignitable mixture in air.
4. Under which section would one find the maximum amount of concentration of a chemical that a worker may be exposed to under OSHA regulations? What is this called?
The PEL is usually found in Health Hazard and First Aid, but some manufacturers also put it under Physical / Chemical properties.
5. Under which section would one find a chemical's ability to be mixed with water or other

chemicals?

Reactivity Data

6. In what fabrication process is HMDS used in microsystems manufacturing?
HMDS is used as a primer at the beginning of the photolithography process prior to applying the photoresist
7. What is an application of HF in microsystems fabrication?
HF is used as a liquid etchant for silicon dioxide. It is normally mixed with BOE (buffered oxide etchant)
8. Where is TMAH used in microsystems fabrication?
TMAH is sometimes used as a liquid etchant for anisotropic etch of silicon. It can also be found in developer in the photolithography process.

References

- SCME Safety Data Sheet
- OSHA (www.osha.gov)
- Safety Data Sheets (<http://www.ilpi.com/SDS/index.html>)

Disclaimer

The information contained herein is considered to be true and accurate; however the Southwest Center for Microsystems Education (SCME) makes no guarantees concerning the authenticity of any statement. SCME accepts no liability for the content of this unit, or for the consequences of any actions taken on the basis of the information provided.

Support for this work was provided by the National Science Foundation's Advanced Technological Education (ATE) Program.