

A Software for Lab Access and Chemical Process Logging in Shared Facilities

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Research safety management, including safety training, documentation, and daily logging, is always a concern especially in multidisciplinary shared facilities. Two years ago in the Microscopy and Microanalysis meeting (Indianapolis, 2013), we presented a software system we designed for Northwestern University for university-level safety management. With that safety management system, Northwestern University shared facilities can make sure every facility user, no matter which department the user comes from, must pass the required safety training before they can use the resources in the laboratory. This safety management system was at instrument level, i.e. an instrument manager may define which safety clearances are required for each individual resource in the laboratory [1].

In this paper we present another system we developed for the Center for Functional Nanomaterials, Brookhaven National Laboratory. As an add-on to the BNL's Facility Online Manager (FOM®) system [2], this software provides the lab access and daily chemical process logging in the cleanroom.

Figure 1 is a screenshot of the access control system. The access control station is usually located beside the main entrance of the laboratory, where every user must scan their ID cards to enter the lab. After scanning an ID card, the user's information is recorded in the main FOM® server and the laboratory can check this record or bill the user based on the time this user works inside the lab. Each user is also asked a random safety question every time they enter the lab. If a user fails any part of the safety questionnaire, the user will be banned from the lab and their name will be listed in the table of "Users who must see a staff member".

The logging of the chemical processes is done on a second computer inside the lab, where a user should record all chemical usage in the lab, as shown in Figure 2. Users can also check out safety documents such as the SOP or MSDS of any chemical at any time while working in the lab. As soon as a user starts a chemical process, the record is shown in the first lab, where the lab manager or another user may check whenever needed. After doing a chemical process, the user must click the End Process button to finish using a chemical. Otherwise their name will be listed in the "Users who forgot to END chemical process".

A lab manager can also see the list of current users in the lab, records of chemical usage. Lab managers can also manage users and resources and edit the tip of the week, recent changes, and safety questionnaire items on their office computers using the main FOM® system.

References:

- [1] S. Li, S.V. Mallipeddi, S. Karlman, T. Moskal and V.P. Dravid (2013). Safety Management in Multidisciplinary Shared Facilities. *Microscopy and Microanalysis*, 19 (Suppl. 2), pp 1396-1397.
- [2] See more details about the Facility Online Manager® software at <http://www.fomnetworks.com/>.

Ongoing chemical processes

User name	Date in	Process
John Smith	2/18/2015	Nickel Etch Type II (
John Smith	2/18/2015	Methanol
Stephanie Campbell	2/18/2015	Osmium tetroxide

Users currently in cleanroom

User name	Date in	Time in
John Smith	2/18/2015	9:05:20 AM
Stephanie Campbell	2/18/2015	9:20:30 AM

Cleanroom log station

Scan barcode

Recent changes

Date	Changes
2/18/2015	The new Cleanroom log station has been launched!
10/1/2014	Hood #4 has been reconfigured.

Users who forgot to END chemical processes

User name	Date in	Process
Juan Alvarado Orozco	1/16/2015	Acetone, Methanol, I

Users who MUST see a staff member

User name	Failed date	Cause
Alexandra Feodorovna	1/17/2015	Failed safety

Tip of the week: "Now that the weather is warming up, it is a good time to remind you that you must wear long pants and closed-toe shoes in all the labs in the CFN. No shorts or sandals are allowed."

Figure 1. A screenshot showing the access control and chemical processes log station in a cleanroom.

SIGMA-ALDRICH SAFETY DATA SHEET

Version: 4.7
Revised Date: 01/22/2015
File: SDS-03100015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers
Product name: Osmium tetroxide
Product Number: 201830
Brand: Sigma-Aldrich
CAS No.: 208-6-12-0

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses: laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet
Company: Sigma-Aldrich
3050 Service Street
SAINT LOUIS MO 63103
USA
Telephone: +1 800 526 3332
Tel: +1 000 526 3332
Emergency telephone number: +1 800 775 6666

2. HAZARD IDENTIFICATION

2.1 Classification of the substance or mixture
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 2), H302
Acute toxicity, Inhalation (Category 1), H310
Acute toxicity, Dermal (Category 2), H311
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Respiratory sensitization (Category 1), H334

2.2 GHS label elements, including precautionary statements
Pictogram: Danger
Signal word: Danger
Hazard statements: H302 + H330 + H334
H314
H311
H318
Precautionary statement(s): P201
P202
P204
Do not breathe dust/fume/gas/mist/spray/vapour.
Do not get in eyes, on skin, or on clothing.
Wash skin thoroughly after handling.

Cleanroom Chemical Process Log Station

Life number

Selection chemical process

- Formaldehyde, 10%
- Formaldehyde, 37%
- Glutaraldehyde, 8%
- Glutaraldehyde, 25%
- Glutaraldehyde, 75%
- LR White Resin, Hard
- LR White Resin, Medium
- Osmium tetroxide (OsO4) 2% aqueous**
- Osmium tetroxide (OsO4) 4% aqueous
- Triaryl Acetate

Description/Precautions

Great care must be taken with osmium tetroxide. The crystals melt at 40°C and are extremely slow to dissolve in water. Both the crystals and diluted aqueous solutions give off fumes of osmium tetroxide, even at 0°C. It has an extremely low TLV (0.0002ppm). Osmium fixatives must therefore always be handled in a fume hood (cupboard), and because they act so rapidly, skin contact must be avoided at all times.

Comments

Waste bottle code: C-01-02

MAP OF WASTE LOCATIONS | SOP | MSDS

START PROCESS | Approx. amount (ml) | END PROCESS

CANCEL / RESET

Figure 2. A screenshot showing the chemical logging system in a cleanroom.