Standard Operating Procedure
Precipitation of Gold from Cyanide Solution using Zinc Powder
Chemical Safety and Security Training

Scope and Application

A brief statement about the SOP goes here. The purpose is to ensure the work is being performed properly, safely, and securely.

Definitions

Specific terms should be defined here as necessary.

Specific Chemical(s) of Concern and Hazard Assessment(s)

1) Zinc powder Zn CAS# 7440-66-6
   a. Hazard(s): Irritant, may be harmful is swallowed. Flammable and risks of explosion.

2) Sodium cyanide NaCN CAS# 7664-93-9
   a. Hazard(s): Very toxic by inhalation, in contact with skin, and if swallowed. Contact with acid liberates very toxic gas. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Hazard Communication and Control

A.) Administrative Controls: When working with potentially hazardous materials, follow all mandated health, safety, and security procedures. Be prepared in case of an emergency (e.g., __telephone numbers___, _____first aid_____, and _____spill kits____).

Review all ____Safety Data Sheets (SDS)____ before handling chemicals or performing tasks.

For questions consult__Chemical Safety and Security Officer (CSSO), Principle Investigator (PI).

B.) Operational Controls:

1) This procedure should only be performed by trained and trusted individuals who have signed off on this SOP, and only when there is a legitimate need and no alternative exists.

2) Perform this procedure using the smallest volume of solution at the lowest possible concentration.

3) Never perform work with cyanide while alone in the laboratory.

C.) Engineering Controls:

Store and perform work with cyanide only in restricted access areas equipped with:

1) adequate physical security and access control measures (locked doors, windows, cabinets).

2) working eye wash and emergency shower _____.

3) adequate local exhaust ventilation such as a properly working fume hood _____.

D.) Personal Protective equipment

a. Head (e.g., hard hat, etc.): none _____

b. Face (e.g., goggles, face shield, etc.): safety glasses or goggles _____

c. Hand (e.g., Butyl gloves, nitrile gloves, etc.): Gloves (SDS did not specify type, would have to look this up elsewhere).

d. Body (e.g., lab coat, Butyl apron, etc.): Lab coat _____

e. Feet (e.g. Rubber, Butyl, etc.): Close-toed shoes _____

Equipment and Supplies

Glassware (volumetric flasks, beakers), and other equipment and supplies would be listed here.

Gold Precipitation Steps

Step-by-step instructions for the procedure would go here.

Sample Handling and Storage

All chemicals and solutions should be properly labeled with the full name, date, concentration, lab/room number and preparer. All chemicals should be tightly sealed and stored in a cool, dry area. Unless otherwise noted, all chemicals should not be stored or used for longer than one year after the date of preparation.

Cyanide should not be stored with or used near acids _____.

Cyanide should be used and stored securely by minimizing the amount kept in storage, keeping in a locked cabinet in a secured, restricted area when not in use. Cyanide purchasing and use should be tracked by management, require supervisor's approval, and cyanide inventories should audited weekly.

Calibration and Standardization

This is a useful section to include in an SOP.

Calculations and Equations
This is a useful section to include in an SOP

Documentation and Data Handling
This is a useful section to include in an SOP

First Aid Procedures
Contact with eyes: Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get immediate medical attention.

Contact with skin: Immediately flush the skin with plenty of water while removing contaminated clothing and shoes. Get immediate medical attention. Wash contaminated clothing before reuse.

Inhalation: Remove exposed person from source of exposure to fresh air. If not breathing, clear airway and start artificial respiration. Get immediate medical attention.

Ingestion: Get immediate medical attention. Do not induce vomiting unless directed by medical personnel.

Other Emergency Procedures
Specific steps for non-first aid emergency response would go here.

Spill response
Specific steps for safe and secure spill response would go here.

Waste Management
Specific steps for safe and secure waste storage and disposal would go here.

References and Resources
SDS(s) and American Society for Testing and Materials (ASTM) documents are possible sources of information.

I have thoroughly read and I understand the Standard Operating Procedure above. I agree to implement all chemical safety and security measures as noted. If I have any questions regarding this procedure I will discuss them with my supervisor and Chemical Safety and Security Officer before doing any work.

_____ Date: _____

Employee/Student Name and Signature

I have discussed this Standard Operating Procedure and the company/university Chemical Safety & Security Plan with this employee/student and answered all questions.

_____ Date: _____

Supervisor Name and Signature