Chemical safety fact sheet: Cyanogen bromide

Cyanogen bromide (CNBr) is a colourless to white crystalline solid with a penetrating odour. It is used as a reagent in chemical synthesis and in molecular biology.

Hazards

CNBr can evolve highly toxic, flammable hydrogen cyanide (HCN) gas in contact with acids or if heated to decomposition. Other hazardous decomposition products include corrosive, toxic hydrogen bromide (HBr). CNBr will hydrolyze slowly on contact with water and moisture in air to produce HCN and HBr.

Improper handling may lead to:

- Severe eye, skin or respiratory tract irritation. Effects may be delayed.
- Evolution of highly toxic HCN and corrosive, toxic HBr. Avoid contact with acids and water.
- Mild to severe cyanide poisoning, with symptoms ranging from dizziness, nausea and drowsiness to unconsciousness, cyanosis and respiratory arrest.

Review the Safety data sheet of CNBr and acquire your lab-specific training before beginning work.

Mandatory control measures

- Exposure prevention is the priority, but all CNBr users must be fully aware of first aid response measures. See Emergency procedures and prepare a ‘grab and go’ package to provide to emergency room personnel in case of exposure.
- Do not work alone or during off hours. Make sure you have a buddy in the laboratory who is aware that you are using CNBr and knows the emergency procedures.
- Prepare and use CNBr only in a properly functioning chemical fume hood. A “Danger – Cyanogen bromide in use” sign must be displayed on the fume hood when samples are left unattended.
- Review or create a laboratory specific procedure for the process in which cyanogen bromide is to be used and incorporate information from this document. Update the procedure as the process changes.
- Wear a lab coat.
- Wear splash-proof goggles.
- Wear two pairs of disposable nitrile gloves.
- Wear long pants and closed-toe shoes.

Safe handling and use

- Purchase the smallest amount of CNBr needed.
- Minimize the scale of the reaction to minimize the amount of CNBr required.
- Use absorbent liners or shallow pans on the work surface to facilitate cleanup of drips or spills.
- Prepare CNBr and use it only in a properly functioning chemical fume hood. Position the fume hood sash between you and the reaction.
- Keep a 1:1:1 mixture of calcium or sodium carbonate, clay kitty litter (bentonite) and sand at the ready to cover any spill and minimize CNBr hydrolysis.
- Keep CNBr separate from acids, acid salts, oxidizers, water and aqueous solutions.
- Store material refrigerated, under nitrogen, and in tightly sealed containers.
Waste handling

- Small quantities (up to 50 mg) of residual CNBr may be deactivated if appropriate to your process. Refer to literature for details and dispose deactivated residue as hazardous waste.
- Collect waste streams containing residual CNBr as hazardous waste.
- Collect liquids containing CNBr in a compatible container and apply a chemical waste label.
- Collect contaminated gloves, pads and any other items with trace contamination in a double plastic bag and apply a chemical waste label indicating “Contains cyanogen bromide residue.”
- Submit a request for waste pickup through the online system.

Emergency procedures

Ensure you know the location of the nearest emergency eyewash, safety shower and chemical spill kit. Inform your supervisor and complete an incident report after any incident.

Grab and go package: it is strongly recommended to print out the following resources so they are ready to take to the hospital in case of exposure:

- Cyanogen bromide Safety data sheet.
- SFU safety fact sheet for cyanogen bromide (this document).
- Your lab specific procedure (if available).

First aid response

- For all exposure scenarios, ask a coworker to call 911 and Campus Security at 778-782-4500 and advise of potential cyanide poisoning, amount of exposure, exposure route (skin, eyes or respiratory), and time since exposure.
- Skin contact: Remove contaminated clothing, rinse affected area with copious, tepid running water or the nearest safety shower for 15 min. Seek immediate medical attention.
- Eye contact: Immediately flush eyes with water for 15 min. Seek immediate medical attention.
- Inhalation: Move person to fresh air. Do not provide mouth-to-mouth resuscitation. Seek immediate medical attention.

Spill response

- Alert others and clear the immediate area where the spill occurred.
- Only attempt cleanup if you have been trained, are equipped and feel comfortable to do so.
- Retrieve the laboratory spill kit and put on additional PPE as necessary.
- Cover spill with a 1:1:1 mixture by weight of sodium carbonate or calcium carbonate, clay cat litter (bentonite) and sand. Scoop up material into a heavy mil plastic bag.
- Double bag the waste, discard any disposable PPE, then seal the bags and apply a chemical waste label, indicating “cyanogen bromide spill cleanup”.
- Submit a request for waste pickup through the online system.
- For large spills that require assistance, evacuate all personnel from the laboratory and post a warning on the laboratory to restrict access. Call Campus Security at 778-782-4500.

References