Spill Kits, Spills, and Waste Disposal of Nanomaterials at UAB

Spill Kits

A nanomaterial spill kit should be readily available in or near each laboratory working with nanomaterials. A nanomaterial spill kit may contain the following:

- Caution tape
- Nitrile or other chemically impervious gloves
- Disposable laboratory coat with elastic wrists
- An N95 or P-100 for which you have been fit tested annually
- Absorbent material (e.g., kitty litter, Vermiculite, etc.)
- Pre-moistened wipes
- Sealable plastic bags (e.g., Ziploc® bags)
- Walk-off mat (sticky mat)
- HEPA-filtered vacuum (labeled as “nanomaterial use only”)
- Spray bottle with water
- Nanomaterials and hazardous waste (if needed) label – Both are located on the website. This is the same as the one used for labeling and waste containers.
- Hazardous waste containers with leak-proof caps

A Nanomaterial Spill

- Be prepared! The Principal Investigator (PI) is responsible for training the staff to clean up a small spill.
    - Verify the staff spill training by sending an e-mail to EHS with the names and BlazerIDs of those trained as well as the date and time of the training. This is the job of the PI.
    - Evacuate the lab if necessary.
    - Activate cleanup team. Only individuals with appropriate PPE, training, equipment (proper spill kit), and authorized for a response to entering the affected area.
    - Notify EHS if necessary. If the staff is not prepared to handle the cleanup of a small spill, they may contact EHS at (205) 934-2487.

- Check for contamination!
    - Check shoes, clothing, and other articles for evidence of contamination with nanomaterials on those who were in the room when the spill occurred.
    - Remove the contaminated items from the person and place them in a plastic bag.
    - Evacuate the room.
- Close interior doors leading to other rooms.
- Access control (barricade the area and prevent people without PPE from entering the site until the cleanup is complete and EHS has cleared the area.)

Liquid Spills

- Cover the spill with wet materials such as wet wipes or wet paper towels.
- Apply absorbent materials (e.g., absorbing “pigs,” spill pillows, liquid traps, etc.)
- Apply a disinfectant over the wet material.
- Wait the designated time listed on the bottle.
- Clean up the spill moving in concentric circles from the outside to the inside.
- Collect and dispose of spill cleanup materials as nanomaterial-bearing waste.
    - Contact EHS for an inspection of the air quality if you are uncertain about whether most of the spilled material was recovered or not sure about the air quality.
- Dispose of the clothing and materials that may have come in contact with the nanomaterials or bag and seal them.
    - Never launder with other items. If you are sending it out for laundering, the bag must have a warning label like the one used for labeling and waste.
- Wash your hands thoroughly using soap and warm water.

Dry Material Spills

Use a designated HEPA vacuum to contain the spilled dry nanomaterials. The vacuum must be labeled **For Nanomaterials ONLY**. Never use compressed air or a broom to clean up dry materials. Dry sweeping would spread the nanomaterials. Use the instructions for cleaning up liquid spills if you do not have a designated HEPA vacuum.

Disposal

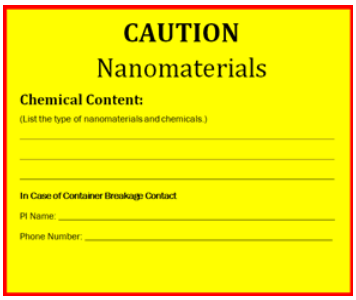
The waste stream is the flow or movement of waste material from the point of generation (your lab) to final disposal (incinerator, landfill, etc.). Nanomaterial-bearing waste may have the nanomaterials come loose or completely out and go into the environment. These must be disposed of as hazardous waste. Nanomaterials that are embedded, we assume it will not become loose and do not have to be disposed of as hazardous waste.

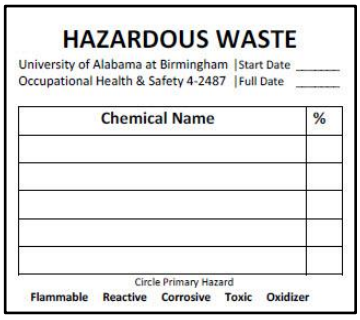
The following waste management guidance applies to nanomaterial-bearing waste streams consisting of:

- Pure nanomaterials (e.g., carbon nanotubes)
- Items contaminated with nanomaterials (e.g., wipes, PPE, bench paper). Any material that comes into contact with nanomaterials becomes nanomaterial-bearing waste (e.g., gloves, other PPE, wipes, blotters). It must be managed as hazardous waste.

- Liquid suspensions containing nanomaterials
- Solid matrixes with nanomaterials that are easily crumbled, or have a nanostructure loosely attached to the surface, such that they can reasonably be expected to break free or leach out when in contact with air or water, or when subjected to mechanical forces. This does not apply to nanomaterials firmly bond in a solid base that will not release nanoparticles to water or when broken.

Any material coming into contact with nanomaterials becomes nanomaterial-bearing waste (e.g., gloves, other PPE, wipes, blotters).





- Never put nanomaterial-bearing waste into the regular trash or down the drain! There is a difference between nanomaterial bearing waste and embedded nanomaterial waste.
- Collect nanomaterial-bearing waste in closed, tightly sealed, labeled, unbreakable containers.
- Label the container with both a nanomaterial and hazardous label (if it contains a hazardous chemical) like the ones shown here.
    - Label the container when the first piece of waste is placed in it.
    - If the nanomaterial waste stream has any chemical hazards associated with it, which takes priority over nanomaterial hazards, for example, if the nanomaterial is dispersed in a flammable liquid, then label as flammable. If the liquid is corrosive, then label as corrosive if the nanomaterial is made of toxic metals, label toxic.
- Keep the container in a laboratory fume hood until it is ready for disposal. The container must remain sealed unless adding waste to it.
- When the container is full:
    - Secure the lid.
    - Remove it from the hood.
    - Place it in a second sealed container in a satellite accumulation area (SAA).
    - Complete the Hazardous Waste Manifest. Make sure that if clearly states NANOMATERIALS.
    - Check the date on your transcript for the last time you completed the Hazardous Waste Handling (CS055) course if you are completing the manifest.

- It must be within the last 365 days before you can send the manifest, or it will be returned.
- Send the manifest to UAB EHS Support Facility.

Regular Waste Stream

Nanomaterials embedded in a solid material that cannot reasonably be expected to break free or leach out when they contact to air or water can be placed in the regular waste stream (trash). We assume that these nanomaterials will not come out of the material and go into the environment. If you have questions, please call EHS at (205) 934-2487.