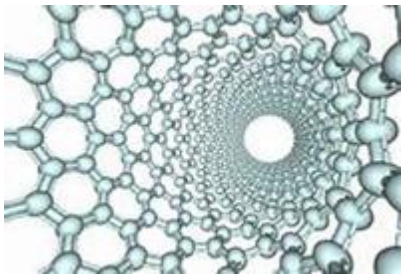
Basic Nanomaterial Safety



This fact sheet provides basic safety guidance aimed at reducing laboratory worker exposure to engineered nanomaterials. This interim document, based largely on existing guidance by the Occupational Safety and Health Administration (OSHA), is intended for use until a more detailed guidance document is developed.

Potential risks associated with engineered nanomaterials are not well defined, and few occupational exposure limits exist. Because of this uncertainty, researchers are advised to use extreme diligence in handling nanomaterials. A combination of the following measures and existing best laboratory practices is suggested to control potential exposures, and minimize potential health risks or environmental impacts.

Engineering Controls

- Work with nanomaterials in ventilated enclosures (e.g., glove box, laboratory hood, process chamber) equipped with high-efficiency particulate air (HEPA) filters.
- Where operations cannot be enclosed, provide local exhaust ventilation (e.g., capture hood, enclosing hood) equipped with HEPA filters and designed to capture the contaminant at the point of generation or release.

Administrative Controls

- Provide hand washing facilities and information that encourages the use of good hygiene practices.
- Establish procedures to address cleanup of nanomaterial spills and decontamination of surfaces to minimize worker exposure. For example, prohibit dry sweeping or use of compressed air for cleanup of dusts containing nanomaterials, use wet wiping and vacuum cleaners equipped with HEPA filters.

Personal Protective Equipment (PPE)

- Use appropriate personal protective equipment:
    - Gloves- use latex or nitrile gloves appropriate for the nanomaterial matrix. Double-gloving is strongly recommended.
    - Protective clothing- lab coats or disposable coveralls should be used to cover skin not otherwise protected. Cotton fabrics do not provide effective protection and should be avoided.
    - Eye protection- Use safety glasses, goggles or face shields. Use goggles when working with aerosols.
    - Respirator use should be considered a last resort; when other ventilation cannot be provided. Respirator use involves a formal program with medical clearance, training, and recordkeeping requirements. Check with Environmental Management for details.
    - Staff who work with animals and may be exposed to airborne materials from urine, feces, bedding, etc. may need additional PPE including but not limited to hair and shoe covers.

Spill Cleanup

- Have appropriate spill materials on hand before beginning your work, and train appropriate personnel in cleanup procedures.

Equipment

- Be aware that it may not be possible to decontaminate equipment contaminated with nanomaterials.
- Equipment should be protected from contact, or dedicated to nanomaterial use.
    - Label dedicated equipment to avoid cross-contamination.

Waste Management

- Collect and contain <u>all</u> waste materials potentially contaminated with nanomaterials.
- Aqueous waste should be contained in properly labeled containers. **<u>Do not</u>** discharge nanomaterial waste to sinks or drains.
- Solid waste materials must be kept moist to avoid aerosolizing, and should be managed as follows:
    - Paper, wipes, PPE and other items with loose contamination are collected in a *sealable* plastic bag in a laboratory hood or appropriate work station
    - Wet the inside of the bag slightly prior to adding waste.
    - When full (or at the end of the day/shift), seal the bag (an additional "wetting" may be done to ensure that the contents of the bag do not dry out prior to closing).
    - Place the sealed bag into the satellite accumulation container
    - Close the satellite accumulation container
    - Ensure that an appropriately completed label is present on the container.
- Submit your waste for pickup through the University's electronic submittal system (www.MissouriState.edu/Environmental)

Medical Screening and Surveillance

- Make available medical screening and surveillance for workers exposed to nanomaterials if appropriate.

OSHA Standards that May Apply to Nanomaterial Hazards

- Nanomaterial use may fall under either OSHA General Industry or Construction standards.
- The General Duty Clause, Section 5(a)(1) of the Occupational Safety and Health Act, also may apply in situations where workers handle or are exposed to nanomaterials.

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