# Nanomaterials Safety

## Introduction

Nanomaterials include any material having at least one dimension less than 100 nanometers. Interestingly, materials of nano-scale may exhibit properties that differ substantially from those of the parent material; this includes the manner in which they interact with the human body and the environment. For example, as a consequence of their small size, their greater surface area per unit mass may increase their chemical reactivity as well as facilitate more rapid transport in air and water. Nanomaterials may readily penetrate intact skin or pass through the lungs reaching the bloodstream, targeting cells and organs within the human body.

At present, very limited information is available regarding safe levels of exposure to nanomaterials; therefore, the use of local exhaust ventilation and proper PPE is essential in controlling exposure to nanomaterials.

## Nanomaterial Safety Requirements at NC State University

Working with nanomaterials at NC State University requires the following steps:

- Complete the NC State Nanomaterial Safety Awareness Training.
- Review hazards and risks associated with using the specific nanomaterial.
- Review the Working Safely With Nanomaterials document.
- Review and complete the Working Safely with Nanomaterials SOP template adding specific information for the subject process.
- Ensure the lab Safety Plan includes the nanomaterial using process and that nanomaterial is checked on the "Target Chemicals" list.

## Optional Resources Highly Recommended for Review

- AIHA Personal Protective Equipment for Engineered Nanoparticles
- Nanotoolkit
- Chemicals with Skin Absorption Hazard
- Working Safely with Nanomaterial Reference guide (This reference guide contains the same information contained in the Nanomaterial Safety Awareness Training.)

**Excellent, short summary of management system for working with nanomaterials**

- Building a Safety Program to Protect the Nanotechnology Workforce

**For more information regarding safety procedures for lab operations:**

- University of Texas Nanoparticles Safety Guide

**Additional resources:**

- Nano.gov resources for Nanotechnology Laboratory Safety
- AIHA nano working group
- OSHA Factsheet on nanomaterials safety

**Please contact NC State EH&S with any questions or concerns.**