EPA
www.epa.gov/research
science in ACTION
INNOVATIVE RESEARCH FOR A SUSTAINABLE FUTURE

Emerging Materials & Technology Research Area

Chemical and material design innovations often incorporate newly developed materials, such as engineered nanomaterials (ENMs), into industrial and consumer products to enhance their performance. EPA's Chemical Safety for Sustainability National Research Program generates data and information on new materials, like ENMs, to support their safe manufacture and use.

EPA's Chemical Safety for Sustainability Research Program

The goal of EPA's Chemical Safety for Sustainability (CSS) National Research Program is to provide information and methods to make better-informed, more timely decisions about the safety of chemicals, many of which have not been thoroughly evaluated for potential risks to human health and the environment.

About Emerging Materials & Technology Research

The **Emerging Materials and Technology** research area develops, collates, mines, and applies information on engineered nanomaterials and other emerging materials and technologies, such as biotechnology products. Principles underlying the release and exposure to humans and ecological species vary according to many factors, making their regular study crucial.

The research conducted in this area aims to provide information to support risk-based decisions about emerging materials by:

- Evaluating the release of engineered nanomaterials and human exposure to engineered nanomaterials with focus on a variety of nanomaterial and product types
- Measuring, assessing, and modeling ecosystem exposure of organisms and vegetation to engineered nanomaterials

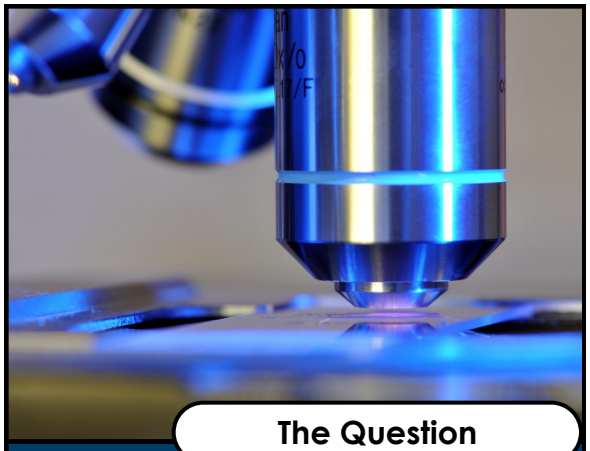
Why Is Emerging Materials & Technology Research Important?

Innovations in chemical material and design are rapidly changing the landscape of industrial and consumer products. Emerging materials and technologies often have unique properties, warranting separate approaches for evaluating hazard and exposure. This research is aimed at filling these data gaps.

Interested In Learning More?

EPA's Chemical Safety Research Program: epa.gov/chemical-research

Contact Us:
Jeffrey Frithsen, National Program Director: frithsen.jeff@epa.gov
Joe Tietge, Deputy Program Director: tietge.joe@epa.gov



The Question

How can we assess the safety of new chemicals and materials?

Our Emerging Materials & Tech Tools

WASP 8: dynamic compartment-modeling program for aquatic systems, updated to accommodate nanomaterials

CompTox Chemicals Dashboard: web-based application providing access to chemistry data for thousands of chemicals across EPA's computational research

Web-ICE: application to estimate acute toxicity to aquatic and terrestrial organisms

HexSim: multi-species, life history simulator ideal for building models of animal and plant population viability, interactions, and responses to disturbances

Emerging Materials & Technology Research Area Up Close

Visualizing the CSS Program

*Our **Emerging Materials & Technology** research is categorized under the **Chemical Evaluation** research topic. This topic is dedicated to developing new and efficient methods to evaluate thousands of chemicals found in consumer products, the air we breathe, and the water we drink.*

How Emerging Materials & Tech Fits In

CSS is organized around three research topics that address specific science challenges in assessing the safety of chemicals: Chemical Evaluation, Complex Systems Science, and Knowledge Translation & Delivery.

Included in our *Chemical Evaluation* research topic, our **Emerging Materials and Technology** research provides methods and tools to enable EPA to evaluate the release, transformation, potential exposure and impacts of emerging materials, including nanomaterials, that are often not amenable to traditional testing methods.

Examples of Research and Products

Simulating Multiwalled Carbon Nanotube Transport in Surface Water Systems Using the Water Quality Analysis Simulation Program (WASP)

⇒ **What is it?:** A journal article detailing an update to the Water Quality Analysis Simulation Program (WASP) to simulate multiwalled carbon nanotube fate and transport in surface waters

⇒ **Impact**: Currently available environmental fate and transport models, which were developed for traditional contaminants, are limited in their ability to simulate nanomaterials' environmental behavior. This research and update advances the simulation and understanding of nanoparticle behavior in aquatic environments.

⇒ **Who Can Use It?:** WASP is publicly available, with a user community that spans across the public sector, private sector, and academia.

⇒ **Learn More:** epa.gov/ceam/water-quality-analysis-simulation-program-wasp

Characterization of engineered nanoparticles in commercially available spray disinfectant products advertised to contain colloidal silver

⇒ **What is it?:** A journal article examining the silver-containing nanoparticles in select commercial products, like certain disinfectants

⇒ **Impact:** This article provides interesting information on the character of the silver in products advertised to contain silver or colloidal silver as an active ingredient, with a high degree in variability between claimed and measured silver.

⇒ **Who Can Use It?:** Everyone, especially those interested in nanomaterials in consumer products

⇒ **Learn More:** doi.org/10.1016/j.scitotenv.2017.11.195

Learn more

EPA's Chemical Safety Research Program: epa.gov/chemical-research