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Abstract Title:

The Latest Emerging Contaminant: Nanomaterials as Personal Care Products and Their Environmental Impact

Authors:

K. Varner - U.S. EPA, Office of Research and Development, National Exposure Research Laboratory, Environmental Sciences Division, Characterization and Monitoring Branch, Las Vegas, NV

S. Kikandi, O. Sadik - State University of New York-Binghamton, Department of Chemistry, Binghamton, NY

Abstract:

Emerging contaminants is an area the U.S. EPA is trying to get a handle on to ensure that new products introduced for man's benefit aren't harmful to the environment.

Nanomaterials falls under this category. The unique characteristics of these materials makes them highly valuable for applications in commercial and medical products such as lotions and cosmetics. BUT where there is a benefit, a risk may also exist. Policy, health, environmental impacts and cleanup along with litigation are a few of the negative effects which may affect nanoscale development. Our goal is to develop novel monitoring/characterization methods for engineered nanomaterials (ENMs) with the initial focus on metal nanoparticles (e.g. silver, gold) and carbon-based nanomaterials (e.g. fullerenes, nanotubes) using electrochemical analyses. The environmental matrices analyzed include ground and/or surface water, soil, and sediment. We are determining methods that will be needed to collect, separate, detect, identify, and quantify the occurrence of these nanomaterials in the environment. Using a quartz crystal microbalance (QCM), we are able measure fullerenes and nanosilver. We are able to measure mass changes as well as the in-situ measurements of charge, current, potential and the resistance changes following the isolation of the particles to determine the presence of nanomaterials. Frequency decrease or mass increase is used to measure the adsorption of C₆₀ fullerenes by the beta-cyclodextrin cavity attached on the QCM for this determination.

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