

3rd International Summit on Toxicology & Applied Pharmacology

October 20-22, 2014 DoubleTree by Hilton Hotel Chicago-North Shore, USA

Nanoparticle exposure assessment, dose metric and controls

Candace Su-Jung Tsai

Purdue University School of Health Science, USA

Inhalation exposure to airborne nanoparticles (NPs) has been reported during manual activities using typical fume hoods and manufacturing processes, published by the author. This research studied potential inhalation exposure associated with the manual handling of NPs using two new nanoparticle-handling enclosures and two biological safety cabinets (BSC), and discussed the ability to contain NPs in the hoods to reduce environmental release and exposure. Airborne concentrations of 5 nm to 20 µm diameter particles were measured while handling nano alumina particles in various ventilated enclosures. Tests were conducted using two handling conditions and concentrations were measured using real-time particle counters, and particles were characterized and collected on TEM grids to determine particle morphology and elemental composition. Airflow patterns were characterized visually using a laser light sheet and fog. The average number concentration increase at breathing zone outside the enclosure was less than 1400 particle/cm³ for each particle size at all tested conditions and the estimated overall mass concentration was about 83 µg/m³, which was less than the dosage of typical nanoparticle inhalation exposure studies. The current occupational exposure limits (OELs) to nanoparticles were under development with few was recommended by NIOSH. The current status of developing strategy for setting OELs discussed that the dose metric needs to be harmonized for exposure assessment and toxicological studies. The challenge of current efforts is to further investigate occupational exposure and the associated biological responses.

Biography

Candace Su-Jung Tsai is an Assistant Professor at Purdue University; she served as a Research Manager for Nanotechnology Environmental Health and Safety in the Center for High-rate Nanomanufacturing at University of Massachusetts Lowell for 5 years after her Doctorate. She is recognized as an expert in investigating nanoparticle exposure assessment and the engineering control techniques to be used for exposure elimination. She has published over 100 journal articles and conference papers related to her ground-breaking research since 2008. She is the executive officer of Nano Group in AIHA and has given numerous plenary presentations in various conferences.

tsai51@purdue.edu