

ME 8773-8774 Seminar

Wednesday October 21, 2009 4 - 5:00 pm, Moos Tower 2-530

ADVANCED INSTRUMENTATION FOR
NANOPARTICLE EXPOSURE AND DOSE DETERMINATION

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Abstract: Nanoparticle exposure is currently discussed within the framework of risk assessment. A potential risk may arise, only if an exposure to toxic particles exists. The investigations of nanoparticle toxicity and the prevention of possible exposure to nanoparticles are major steps towards sustainable development of nanotechnology. Results from our studies to develop adequate instrumentation for quantifying nanoparticle exposure and (internal) dose will be presented.

For exposure measurements nanoparticles with different structures have to be defined. The measurement location also plays an important role for the exposure–dose relationship. The relevant exposure metric is finally determined by considering health effects. Inhalation of airborne nanoparticles is considered as a major uptake route due to the direct deposition in the human body. Airborne nanoparticle release can occur during their production, handling, use or recycling and workers in these areas may face increased exposure levels.

The existing measurement techniques will be briefly discussed and the desirable instrumentation currently not available will be identified. Product nanoparticles occur in different shapes and agglomerates. Electrical techniques used thus far assume the particles are spheres. New techniques for sizing and total concentration measurements for structured nanoparticles will be presented. It will be demonstrated how the exposure–dose relationship can be derived based on deposition models or directly by instrument design.



Bio: Heinz Fissan was a professor of Process- and Aerosol Measurement Technology in the Department of Electrical Engineering Science at the University Duisburg-Essen for 30 years until 2004. His group was well known for its basic research in the field of coagulation, filtration, transport and deposition of aerosols. His group was also known for the more applied research in the fields of fire detection, exhaust gases from combustion processes, ambient aerosols, contamination control and nanostructured gas sensor development. Over the years he was involved in the development of several commercialized instruments.

Since 2004 he has served as consultant for several companies and the University of Minnesota. In 2006 he was also appointed as the Scientific Director for the Institute of Energy and Environmental Technology e.V. (IUTA), Duisburg, Germany. His current research interest is in the field of airborne product nanoparticles released into the environment by technical processes and in the development of a sustainable nanotechnology.

He has more than 300 refereed publications, patents and numerous awards.

Please join us for a wine and cheese reception, sponsored by TSI, Incorporated, at the Campus Club, Coffman Memorial Union, immediately following the lecture.

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