

Nanoparticle Fate for a Safer Work Environment

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Engineered nanoparticles (ENPs) are used in numerous applications, including consumer products such as cosmetics, sunscreens, filters, electronics, and ink. One method of producing these nanoparticles involves using an industrial-sized diffusion burner. This production process has been carefully studied to determine ENP size range, morphology, and concentration as a function of design and operating variables. Toxicity studies have shown the potential danger of ENP exposure. However, potential worker exposure is not well characterized because these ENPs may undergo physical and chemical changes while traveling through ambient air from a leak in the production process to the worker (*figure*)

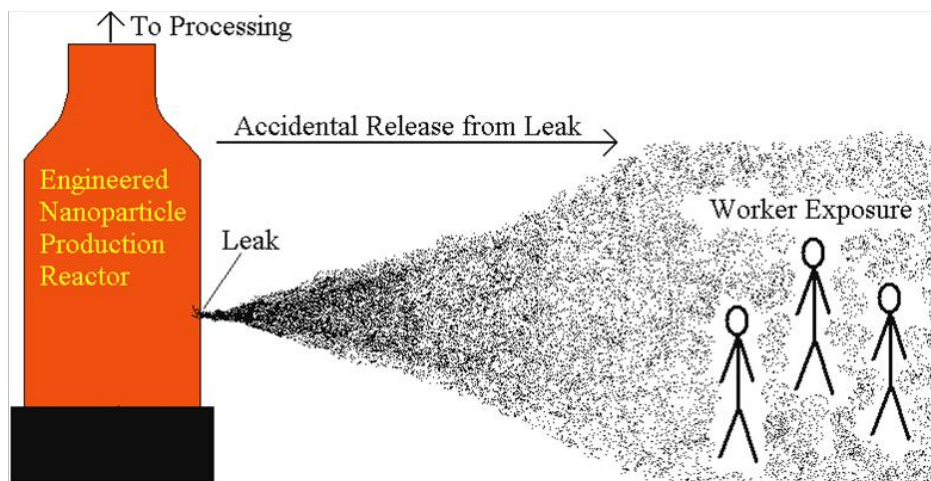


Figure. *caption*

We simulated a leak in an ENP production process, with both experiments and computer simulations, in order to study these changes. With the correct particle size and concentration known at various distances from the leak, realistic worker exposure can be determined and appropriate protection schemes can be developed.

The initial stage of this work consisted of a filter study to examine the agreement between two aerosol measurement instruments in the nanoparticle size range. This study suggested a new method of rating filters using nanoparticles.