**2008 AAAR Annual Conference Abstracts** *Indoor Aerosols and Aerosol Exposure*

**10C.03**

**Lung deposited surface area concentration and particle size**

**distribution in welding fumes measured in real workplaces**

**with high time resolution.** CHRISTOF ASBACH (1), Astrid C.

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Health effects of fine and ultrafine particles have raised

increased interest over the recent years. Welding fumes are one

of the major sources of nanoscale particles leading directly to

the exposure of workers. Those fumes are known to contain high

particle number concentrations and toxicologically relevant

metals. Despite this relevance only very few studies

investigating the nanoscale fraction of welding fumes in detail in

real work areas are known.

In the study presented here, particle number size distribution and

lung deposited surface area were measured in a real workplace

environment in a welding workshop in southern Sweden.

The welding activities were intermittent, with welding periods

and breaks, each lasting from a few seconds to approximately

one minute. The resulting quick fluctuations for particle

concentrations and size distributions as well as the associated

particle dynamics required a high time resolution of the

measuring devices. Instruments involved in this study included a

Fast Mobility Particle Sizer (FMPS, TSI Model 3091, 1 s time

resolution) measuring particle size distributions and a

Nanoparticle Surface Area Monitor (NSAM, TSI model 3550)

delivering the surface area concentration deposited in the

alveolar region with 10 s time resolution.

Measurements were conducted either approximately 5 m away

from the welding activity to measure how the background is

affected by welding activities or directly in the plume.

Measurements in the plume were subject to very high particle

concentrations. Therefore a two stage ejector dilution system

(combined ratio 1:150) was used in order to minimize

coagulation upon sampling and to reduce particle

concentrations.

Results show that FMPS and NSAM could both follow the

dynamics well and are in good agreement. Regression analysis

of total lung deposited surface area concentration versus particle

number concentration during background measurements showed

that different particle generation processes can quite clearly be

distinguished by the slope.

**10C.04**

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