

Title *

Fine and ultrafine particles from indoor sources – Physico-chemical characterization

Abstract *

While anthropogenic emissions of ambient outdoor particulate matter (PM) are under intensive discussion (e.g. due to high traffic emissions and environmental zoning), particulate indoor emissions are less well studied. The EPIA project was conducted with the aim: (1) to characterize potentially relevant indoor sources of fine and ultrafine particles with respect to their emission levels, composition and (2) to evaluate the potential health effects through *in vitro* toxicity testing and a controlled exposure study in healthy adults. The following emissions were evaluated: (1) burning candles, (2) toasting bread, (3) baking pizza, (4) frying sausages (5) operating a chimney, (6) vacuum cleaning, (7) engine emissions of a vacuum cleaner, (8) hot air radiator, (9) butane and spirit burner, and (10) grinding of a nanoparticles-containing paint. Characterization included particle mass concentration (PM₁₀, PM_{2.5}, and PM₁), particle number size distribution including UFP number concentration, lung-deposited surface area, organic and elemental carbon (OC/EC), further organic compounds and inorganic elements, and particle morphology. Moreover, the oxidative potential (OP) was determined by electron spin resonance spectroscopy. The emission sources sausage frying, candle burning and bread toasting emitted significantly increased particle number counts and mass concentrations of submicron particles (20 to 100-fold higher values than in the urban outdoor air). Subsequent toxicological in-vitro tests and a controlled exposure study with these sources were performed. This study was supported by the German Federal Environment Agency (UBA, FKZ3711-62-205).

Permission to publish *



Check this box to give us permission to publish your abstract on a flash drive/USB Stick for distribution to all delegates if it is accepted for presentation

Affiliations and Authors *

Author Information

Bryan Hellack (Presenting)

Affiliations

Institute of Energy and Environmental Technology (IUTA) e.V., Duisburg, Germany

Author Information

Thomas Kuhlbusch

Affiliations

Institute of Energy and Environmental Technology (IUTA) e.V., Duisburg, Germany
BauA - Federal Office for Occupational Safety and Occupational Medicine, Dortmund, Germany

CENIDE - Center for Nanointegration, Duisburg, Germany

Author Information

Ulrich Quass

Affiliations

Institute of Energy and Environmental Technology (IUTA) e.V., Duisburg, Germany

Author Information

Heinz Kaminski

Affiliations

Institute of Energy and Environmental Technology (IUTA) e.V., Duisburg, Germany

Author Information

Soppa Vanessa

Affiliations

University of Duesseldorf, Institute for Occupational, Social and Environmental Medicine, Medical Faculty, Duesseldorf, Germany

Author Information

Frauke Henning

Affiliations

University of Duesseldorf, Institute for Occupational, Social and Environmental Medicine, Medical Faculty, Duesseldorf, Germany

Author Information

Barbara Hoffmann

Affiliations

University of Duesseldorf, Institute for Occupational, Social and Environmental Medicine, Medical Faculty, Duesseldorf, Germany

Author Information

Roel Schins

Affiliations

IUF-Leibniz Research Institute for Environmental Medicine, Duesseldorf, Germany