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Formation of ultrafine particles by chemical reactions in indoor air: Effect of ventilation and relative humidity

S. Langer (1), K. Pointet (1), J. Moldanová (2), E. Ljungström (3), L. Ekberg (4)

(1) SP Swedish National Testing and Research Institute, Department of Chemistry and Materials Technology, Brinellgatan 4, P.O. Box 857, SE-501 15 Borås, Sweden

(2) IVL Swedish Environmental Institute, Box 5302, SE-400 14 Göteborg, Sweden

(3) Chalmers University of Technology, Inorganic Environmental Chemistry,

SE-412 96 Göteborg, Sweden

(4) CIT Energy Management, SE-412 96 Göteborg, Sweden

sarka.langer@sp.se

Phone +46 33 16 52 87

In this work, the reaction of ozone with limonene, as a source of ultrafine particles ($<$ 0.1 μm), has been investigated at concentrations relevant to indoor environments as a function of ventilation (expressed as Air Change Rate, h^{-1}) and relative humidity. A stainless steel chambers - one with a volume of 17 m^3 and another one with a volume of 1 m^3have been used for the static experiment as well as the dynamic and humidified experiments.

Particle number concentration (d $>$ 0.03 μm) as a function of time was monitored by a "stand alone" condensation particle counter (TSI, model 8525, P-Trak). Number concentration and size distribution between 0.003μm and 0.1 μm were monitored using a scanning mobility particle sizer together with a condensation particle counter TSI 3936 SMPS-instrument.

The experiments clearly showed formation and growth of ultrafine particles from the chemical reactions taking place in the chambers. Particle concentrations as a function of ventilation and relative humidity will be presented.