

PHYSICO-CHEMICAL PROPERTIES OF SECONDARY ORGANIC AEROSOL (SOA) PARTICLES GENERATED UNDER LABORATORY PHOTOOXIDATION CONDITIONS

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The goal of this experiment is to investigate the chemical reactivity of secondary organic aerosol particles (SOA) in the presence of NO_x . Of special interest is the question whether or not SOA enables the reduction of NO_2 to $HONO$, an important photochemical OH precursor. We report the controlled production of SOA particles using 5ppm of toluene (C_7H_8) or limonene ($C_{10}H_{16}$) in the presence of O_3 or NO_2 at 60% r.h. at 1 atmosphere of air using a (filtered) 150W high-pressure Xe arc lamp as a photon source. The particle production is taking place in an atmospheric pressure flow cell whose gas phase residence time was chosen to lie in the range of one to several seconds. The gas phase is monitored using a differentially pumped quadrupole mass spectrometer whereas the condensed phase has been characterized both by its total particle count using a Condensation Nucleation Counter (CNC) or a downstream Differential Mobility Analyzer (DMA) coupled to an additional CNC. Particle counts of several 10^5 particles cm^{-3} were routinely achieved. Both O_3 and NO_2 are removed immediately after the flow reactor using a diffusion denuder coated with either KI or NDA. The flow has been directed across a glass fiber filter during one to two hours at constant throughput. Subsequently the SOA particles supported on the glass fiber filter, typically a few mg, have been investigated in a low-pressure Knudsen flow reactor using NO_2 and H_2O .