



## Particle formation following the ozonolysis of sesquiterpenes, a laboratory study

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Biogenic particle formation has potential impacts on human health, regional haze, and climate change. The gas phase oxidation of sesquiterpenes,  $C_{15}H_{24}$  biogenic compounds emitted by vegetation, is presently not well understood. However, it has been established that the reaction of sesquiterpenes with ozone is rapid and controls the atmospheric lifetime of these compounds, which is on the order of minutes, and that the secondary organic aerosol (SOA) yields are very large, > 70%. However, the efficiency of new particle formation following sesquiterpene oxidation in the atmosphere remains an open question. Results from laboratory studies of particle nucleation following the gas-phase oxidation of  $\beta$ -caryophyllene and  $\alpha$ -humulene, two of the most abundant sesquiterpenes, are presented in this work. This study combines laboratory nucleation measurements and interpretation using a molecular level nucleation model recently developed in our laboratory. The nucleation model and parameters derived from this work are intended for use in evaluating sesquiterpene particle and SOA formation under realistic atmospheric conditions (temperature and concentration). Nucleation experiments were performed in a 70 L Teflon bag reactor and include measurements made over a range of temperatures, 280 to 310 K, and sesquiterpene concentrations.