

Interactive comment on “Elemental composition and oxidation of chamber organic aerosol” by P. S. Chhabra et al.

P. S. Chhabra et al.

puneet@caltech.edu

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Experiment 2 (α -pinene + O₃) in this publication corresponds to experiment 4 in Table 1 in Chhabra et al. (2010), in which publication Fig. 3 provides the organic mass concentration, which reaches a maximum of about 30 ug/m³. In Table 1 in Chhabra et al. (2010) and Chhabra et al. (2011) a maximum mass concentration of 53.8 ug/m³ is given, however. Can this difference be explained by the applied correction for wall losses.

Organic loadings reported in Table 1 of Chhabra et al., (2010) are suspended loading

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data and are not wall loss corrected. However, organic loadings reported in Table 1 of Chhabra et al., (2011) for the additional phenol, guaiacol, syringol, and α -pinene photooxidation experiments are wall loss corrected. Table 1 has been revised so that all organic loadings listed are wall loss corrected.

In Chan et al. (2010) it is indicated that wall losses were corrected following Keyword et al. (2004). In the last publication, the wall loss rate was found to be quite strongly dependent on particle size, decreasing from 0.01/min for particles with diameter 20 nm to 0.0002/min for particles with diameter 300 nm. Could the authors indicate which wall loss rate was assumed, in order to obtain the value for the aerosol mass concentration in Table 1?

Wall loss rates are first order with respect to particle number concentration and a function of size. Using the wall loss rate corresponding to a specific size bin, we calculate how many particles of that size will be lost to the wall from the current time to the next time step. These particles are then added back to the measured value for each time step. This is done for every size bin. Wall loss rates are calculated every 3-6 months. Generally, wall loss starts at 0.01-0.02 min⁻¹ for particles under 50 nm in diameter, decreases to 2e-5 to 1e-4 min⁻¹ for particles 220-270 nm, and increases to 0.001 min⁻¹ for 800 nm particles.

For experiments 3 and 4 in Table 1 in this publication, photooxidation using OH radicals was performed on α -pinene. It was not immediately clear from Table 1 how OH-radicals were produced. For experiment 3 (low NO_x) possibly H₂O₂ was used, and for experiment 4 HONO and/or CH₃ONO. Were (initial) concentrations measured or estimated for these OH-precursors?

For all low-NO_x photooxidation experiments, H₂O₂ was used. For the α -pinene high-NO_x experiment, CH₃ONO was used. Table 1 has been revised to report the OH precursor for each experiment. Methods for synthesizing both HONO and CH₃ONO are described in detail in Chan et al., (2010). The mixing ratio of H₂O₂ injected into the

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chamber was calculated to be 4 ppm based on a mass balance of the injected solution. The concentration of CH₃ONO was estimated to be 200-400 ppb based on the vapor pressure of the injection bulb measured using a capacitance manometer. The concentration of HONO in the chamber was not measured but based on hydrocarbon decay, the initial OH radical concentration is 1-3E7 molec cm³.

Also, is the spectrum of the applied radiation available? Possibly the authors could refer to a previous source with more detailed information or provide some indications of J-values during the experiments.

The J-values varied from 0.024 min⁻¹ to 0.24 depending on the fraction of lights used for each experiment.

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