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*Supplement of*

## **Secondary organic aerosol formation from hydroxyl radical oxidation and ozonolysis of monoterpenes**

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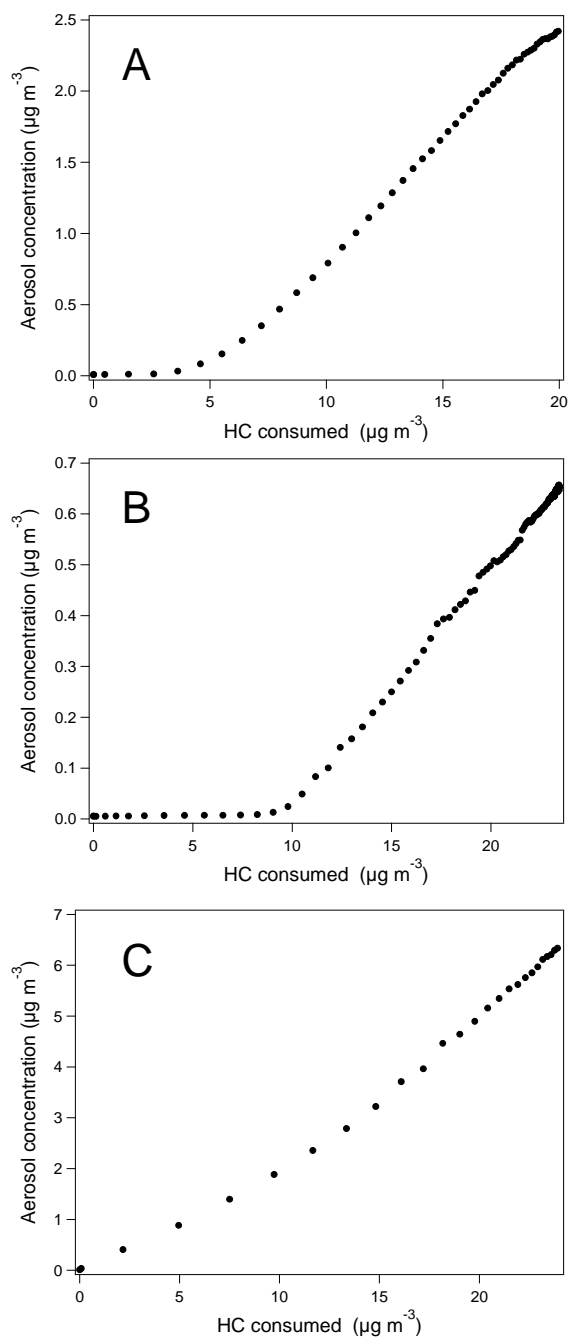


Figure S1. Time dependent growth curves of the aerosol from ozonolysis of  $\alpha$ -pinene (a),  $\beta$ -pinene (b) and limonene (c).

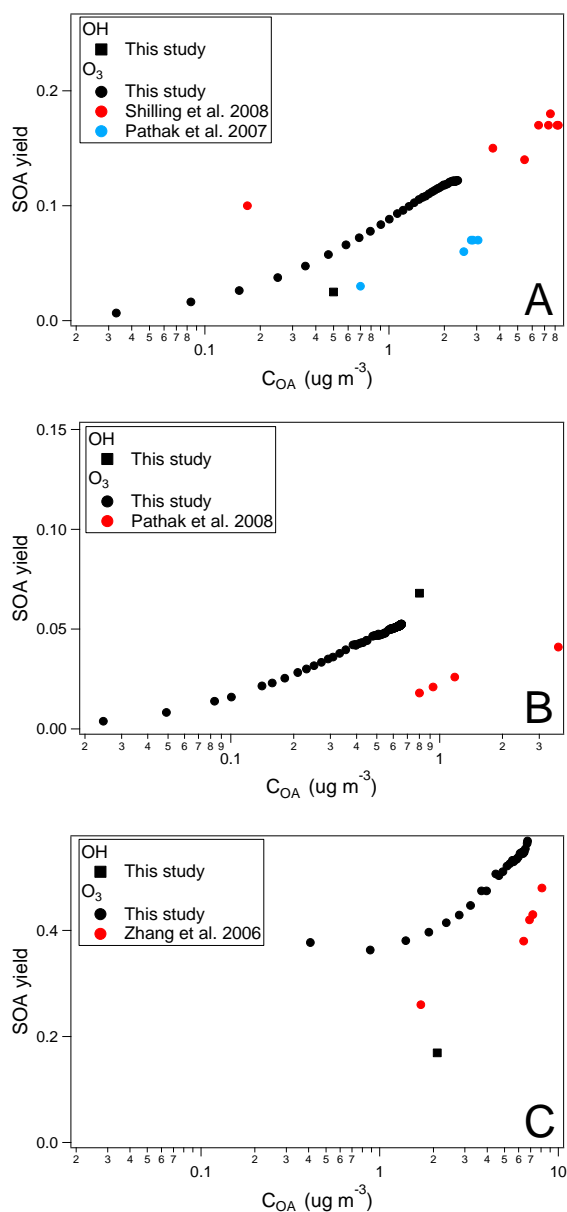


Figure S2. Aerosol yield from the OH oxidation and ozonolysis of  $\alpha$ -pinene (a),  $\beta$ -pinene (b) and limonene (c) as a function of organic aerosol loading ( $C_{OA}$ ). Data from literature at the similar organic mass loading with this study are shown. Experimental conditions including the OH scavenger, temperature and RH etc. are not exactly the same as these studies in the literature.

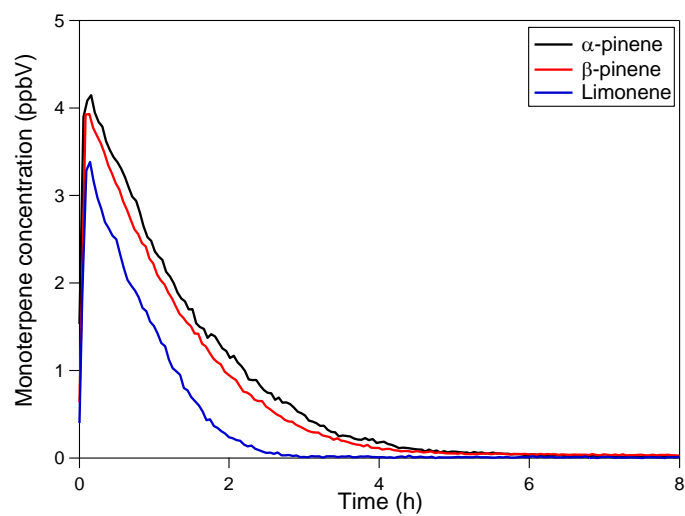


Figure S3. Monoterpene concentration time series during the OH oxidation of each monoterpene measured by PTR-MS.

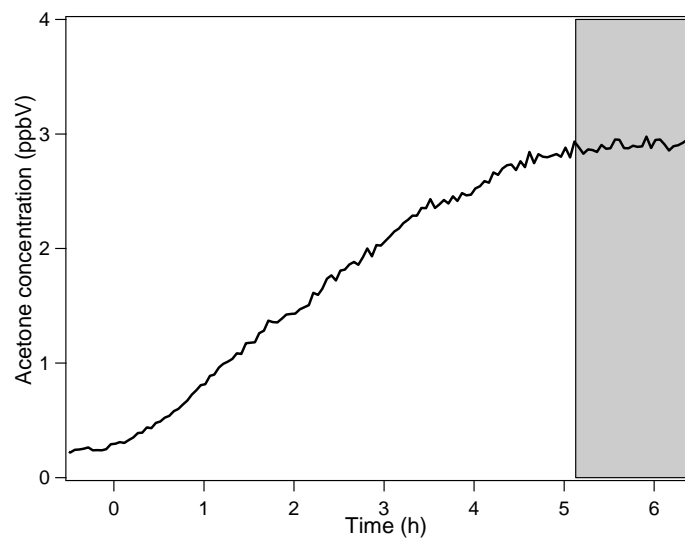


Figure S4. Time series of acetone concentration during OH oxidation of  $\alpha$ -pinene. The grey shaded area shows the dark period.

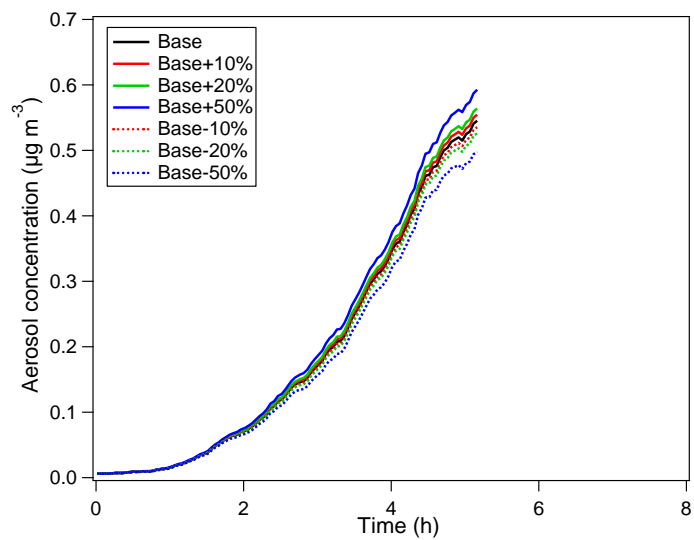


Figure S5. Sensitivity of corrected aerosol mass concentration to the uncertainty of the particle loss rate in the OH oxidation of  $\alpha$ -pinene. Base is obtained using the particle wall loss rate determined in this study. Aerosol mass concentration is checked by varying particle wall loss rate by 10%, 20%, 50%.

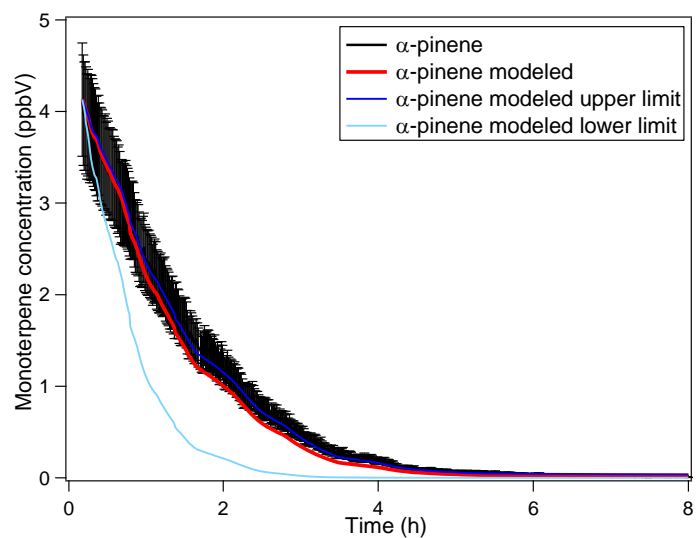


Figure S6. Measured monoterpene concentration time series and modeled monoterpene concentration calculated using the initial monoterpene concentration and the loss by the reaction with OH (reaction rate is product of monoterpene concentration, measured OH concentration and rate constant) and dilution. The limits are defined by the uncertainty of monoterpene data, OH data and the reaction rate constant of the monoterpene with OH.

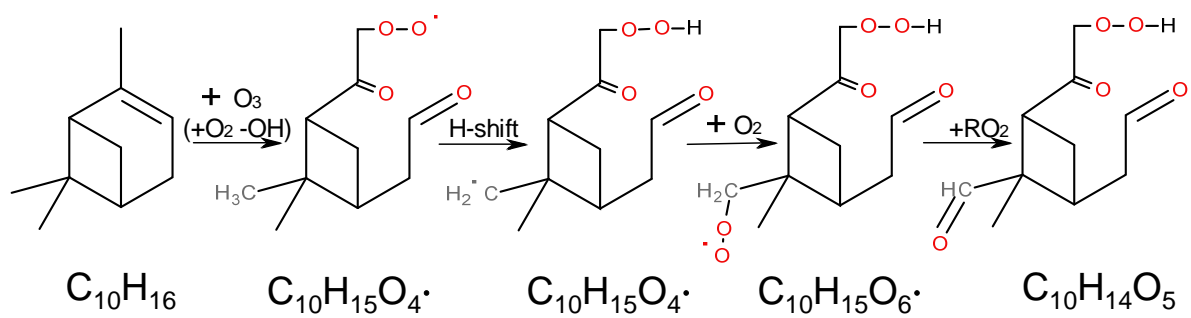


Figure S7. Schematics illustration of one possible pathway of reducing H/C for  $\alpha$ -pinene ozonolysis.



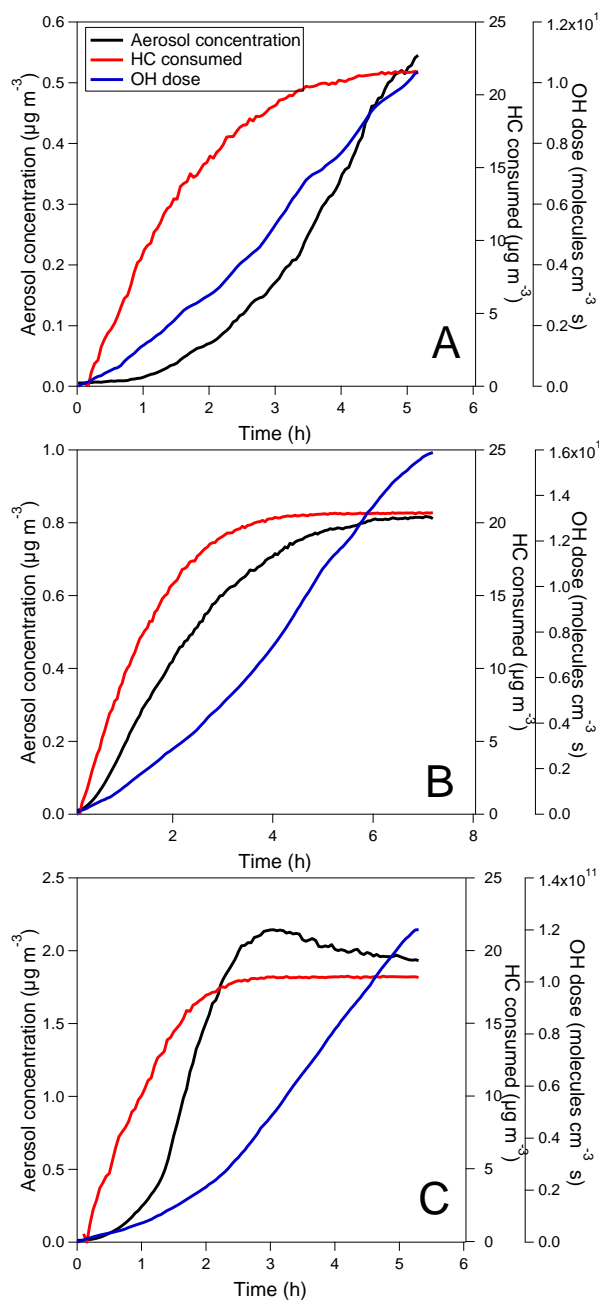


Figure S8. Aerosol mass concentration, OH dose and hydrocarbon consumed (monoterpene here) as a function of reaction time for  $\alpha$ -pinene (a),  $\beta$ -pinene (b) and limonene (c).