Supplement of

The Aarhus Chamber Campaign on Highly Oxygenated Organic Molecules and Aerosols (ACCHA): particle formation, organic acids, and dimer esters from α-pinene ozonolysis at different temperatures

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Figure S1. Concentration of O$_3$ (ppb, black) and wall-loss corrected SOA mass (µg m$^{-3}$, red) and particle number (cm$^{-3}$, green, particle diameter: 10-400 nm, measured by SMPS) along with recorded RH (%) and Temperature (°C, blue) during 10 ppb α-pinene oxidation experiments (Exp. 1.1-1.5)
Figure S2. Concentration of O₃ (ppb, black), α-pinene (ppb, dark green), and wall-loss corrected SOA mass (µg m⁻³, red) and particle number (cm⁻³, green, particle diameter: 10-400 nm, measured by SMPS) along with recorded RH (%), teal) and temperature (°C, blue) during 50 ppb α-pinene oxidation experiments (Exp. 2.1-2.3 & 3.1-3.)
**Figure S3.** Concentrations (µg m⁻³) of acids and dimers from UHPLC/ESI-qTOF-MS analysis of repeated experiments performed at 50 ppb α-pinene and 20 °C (Exp. 2.1 & 3.1), 0 °C (Exp. 2.2 & 3.2) and -15 °C (Exp. 2.3a, 2.3b & 3.3). Bars to the right (dark colored) represent average concentrations and associated standard deviations.

**Figure S4.** O:C-ratios and concentrations (µg m⁻³) of DTAA, DTA and MBTCA in SOA particles from 10 and 50 ppb α-pinene oxidation experiments performed at 20, 0, and -15 °C (Exp. 1.1-1.3 and Exp. 2.1-2.3).

**Figure S5.** Comparison of relative yields (yield at -15 °C / yields at 20 °C) for specific dimer esters as a function of dimer ester O:C ratio in 10 and 50 ppb α-pinene ozonolysis experiments. Vertical line indicates the O:C value (0.38) above which all dimer esters show a decrease in concentration at – 15 °C compared to 20 °C.
Figure S6. A) Correlation plot of pinonyl-pinyl ester conc. (µg m⁻³) and pinic acid (µg m⁻³) across all conducted experiments. B) Correlation plot of pinyl-diaterpenyl ester conc. (µg m⁻³) and MBTCA (µg m⁻³) across all conducted experiments. C) Conc. (µg m⁻³) of pinonyl-pinyl ester conc. and pinic acid in SOA particle formed from 10 ppb oxidation experiments performed at 20, 0, and -15 °C and during temperature ramping (20 to -15 °C & -15 to 20 °C). D) Conc. (µg m⁻³) of pinyl-diaterpenyl ester conc. and MBTCA in SOA particle formed from 10 ppb oxidation experiments performed at 20, 0, and -15 °C and during temperature ramping (20 to -15 °C & -15 to 20 °C)