Supporting information

Table S1. Overview of the model input (apart from the volatility distributions) and diffusion volumes.

General settings		
Density, ρ	(kg m^{-3})	1200
Surface tension, σ	(N m^{-1})	0.3
Diffusion coefficient, D	(10^{-6} m^2 s^{-1})	5
Temperature dependent factor for D, μ	(-)	1.75
Accommodation coefficient, α_m	(-)	1

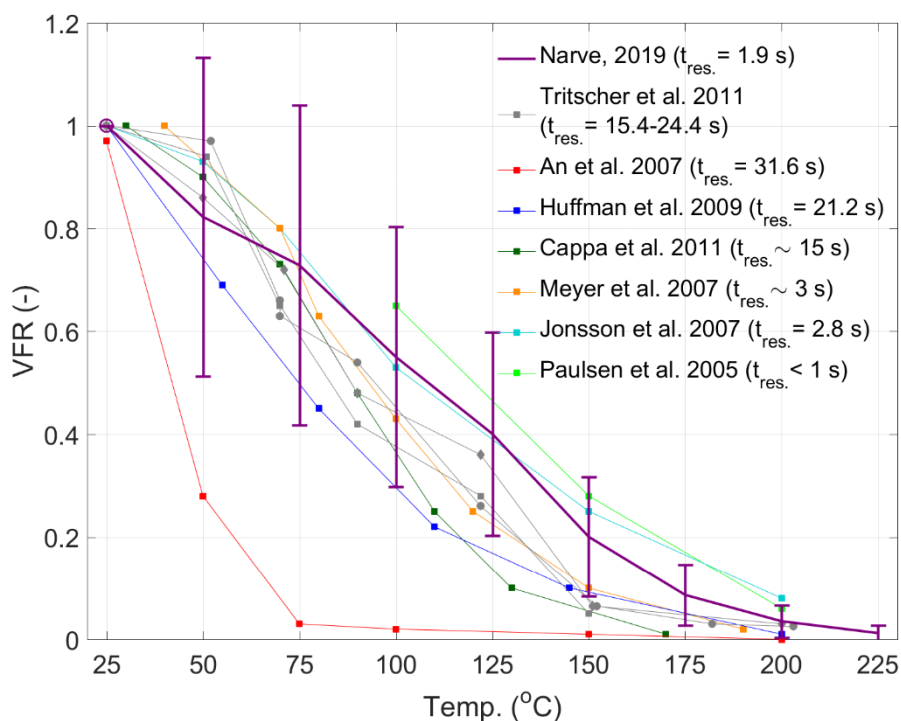| Atomic and structural diffusion volumes	
C	15.9
H	2.31
O	6.11
N	4.54
Aromatic ring	-18.3
Heterocyclic ring	-18.3
Air	19.7

Figure S1 Measured VFRs of α-pinene ozonolysis vs. temperature and comparison to literature, based on different residence times within the TD.

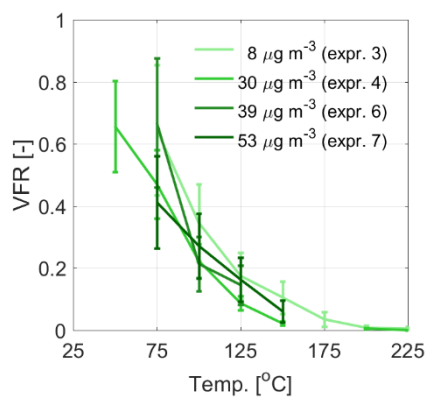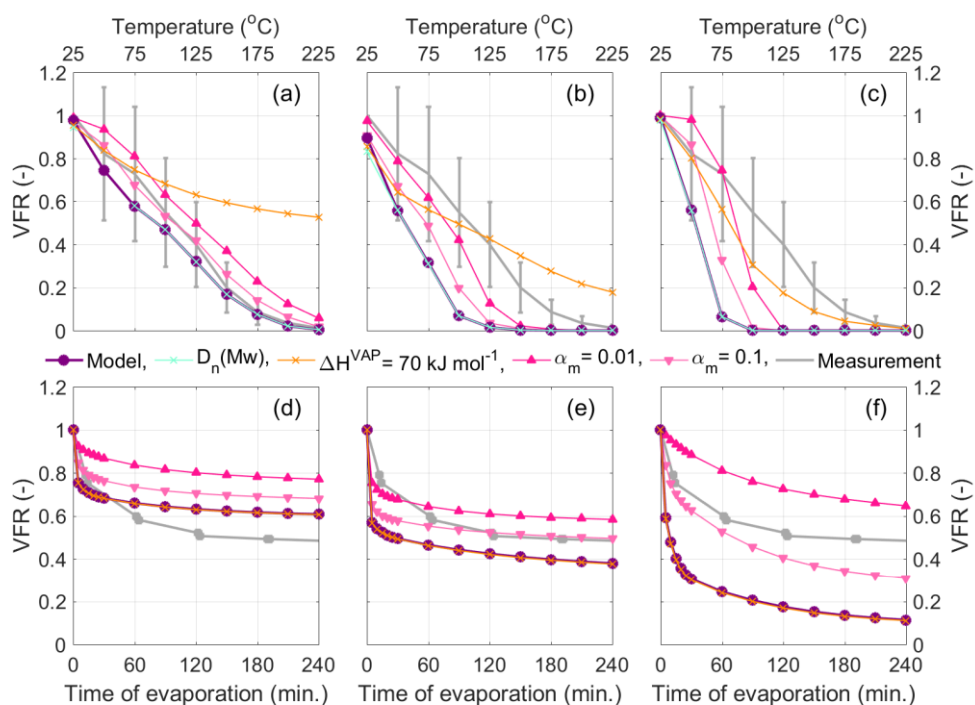**Figure S2 VFR as a function of VTDMA temperature for four different initial mass loadings from the nitrate oxidation of α-pinene.**

Figure S3. Sensitivity study based on α-pinene ozonolysis with the original model output (purple) and measurements (grey), for a fixed vaporization enthalpy, ΔH^{VAP} = 70 kJ/mol (yellow), reduced accommodation (α_m, set to be either 0.1 or 0.01 (pink)), and a mass-dependent diffusion coefficient (blue).
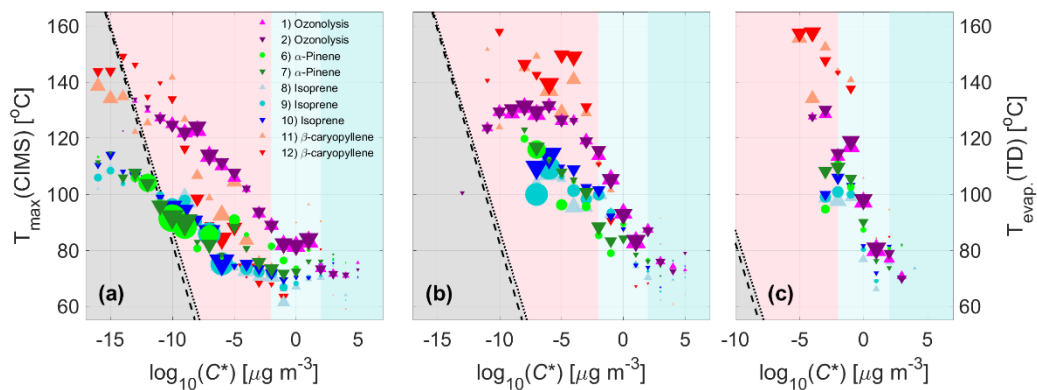
Figure S4. The TD temperatures at which 50 % (dashed line) or 99 % (dotted line) of species with a given C^* are predicted to evaporate for (a) MHR, (b) IvWA and (c) PRK according to the kinetic model. Grey shading indicates regions where the majority of the species with a given C^* are expected to be in the particle phase, and pink (+ blue) shading regions with gas phase dominating the partitioning within our VTDMA setup. The markers represent the mean maximum desorption temperature (T_{max}) within the FIGAERO-CIMS as a function of the C^* values for α-pinene ozonolysis (purple) and the nitrate oxidation of α-pinene (green), isoprene (blue) and β-caryophyllene (orange). The marker sizes are proportional to the mass fraction observed in the studied systems. The blue areas mark the range of C^* which is sensitive towards iso-thermal evaporation at room temperature with our setup, based on the results shown in Figs. 4 and 5.