

Supplementary information

Secondary Aerosol Formation from Mixtures of Marine Volatile Organic Compounds in a Potential Aerosol Mass Oxidative Flow Reactor

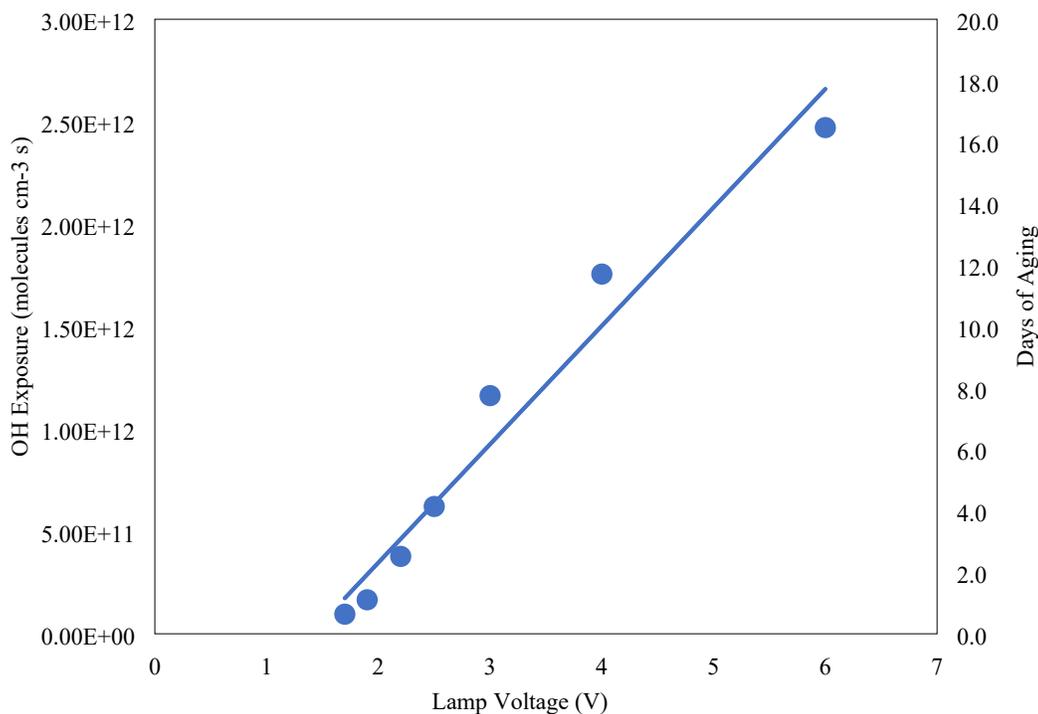
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Figure S1: Calibration curve for PAM-OFR lamps



| [CO] (ppm) | Lamp voltage (V) | OH exposure | Days of aging |
|------------|------------------|-------------|---------------|
|------------|------------------|-------------|---------------|

| | | | |
|--------|-----|--------------------------------|------|
| | | (molecules cm ⁻³ s) | |
| 0.9967 | 0 | 0 | 0 |
| 0.9825 | 1.7 | 9.57E+10 | 0.7 |
| 0.9722 | 1.9 | 1.66E+11 | 1.3 |
| 0.9418 | 2.2 | 3.78E+11 | 2.9 |
| 0.9080 | 2.5 | 6.21E+11 | 4.8 |
| 0.8372 | 3.0 | 1.16E+12 | 9.0 |
| 0.7659 | 4.0 | 1.76E+12 | 13.5 |
| 0.6880 | 6.0 | 2.47E+12 | 19.1 |

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18 Table S1: Experimental conditions for aerosol filter experiments

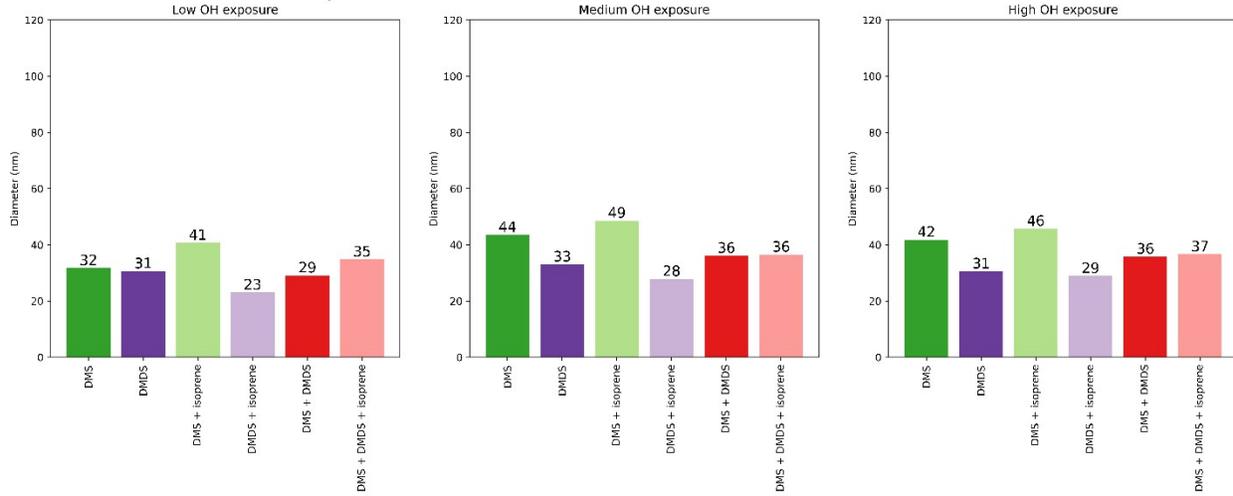
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| Experiment | VOC source | VOC concentration (ppb) | OH exposure (molecules s cm ⁻³) |
|-----------------------|---|---------------------------------------|---|
| DMS | G-cal | 16 | 3.8 × 10 ¹¹ |
| DMDS | Permeation tube | 9 | |
| Isoprene | G-cal | 15 | |
| DMS + isoprene | G-cal | 15 (DMS) 11 (isoprene) | |
| DMDS + isoprene | Permeation tube (DMDS) G-cal (isoprene) | 6 (DMDS) 15 (isoprene) | |
| DMS + DMDS | G-cal (DMS) Permeation tube (DMDS) | 18 (DMS) 9 (DMDS) | |
| DMS + DMDS + isoprene | G-cal (DMS) Permeation tube (DMDS) G-cal (isoprene) | 15 (DMS) 9 (DMDS) 12 (isoprene) | |

20 Figure S2: Particle number and volume distribution parameters for low, medium and high OH
21 exposure (VOCs and mixtures).

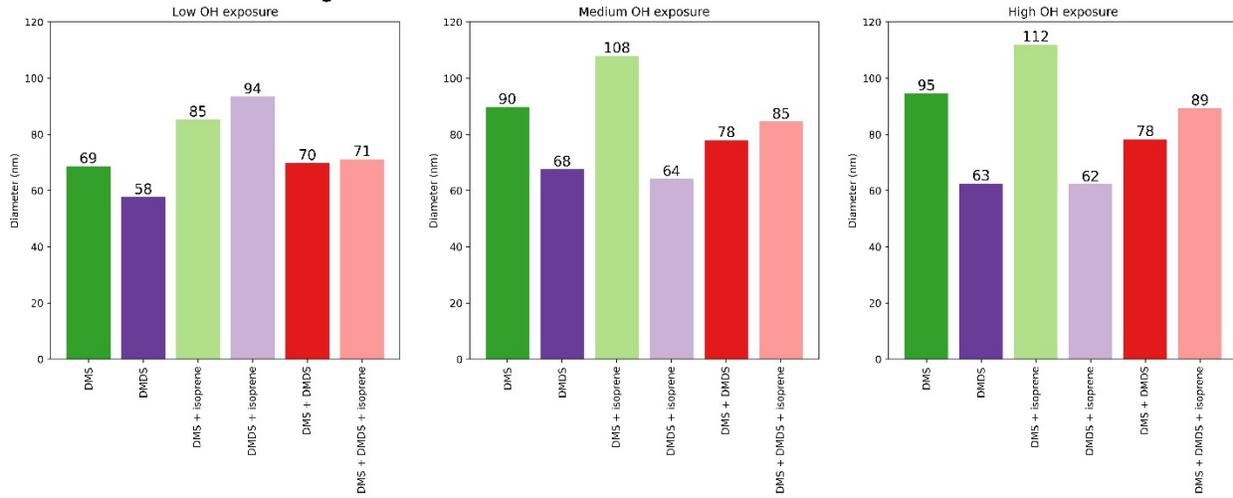
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A. Median number-weighted diameter



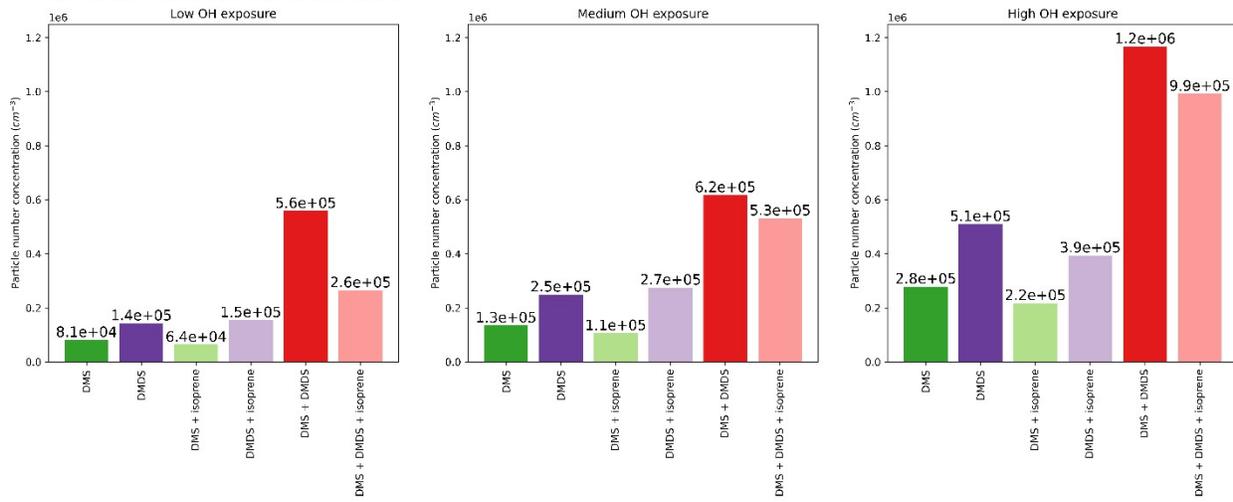
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B. Median volume-weighted diameter



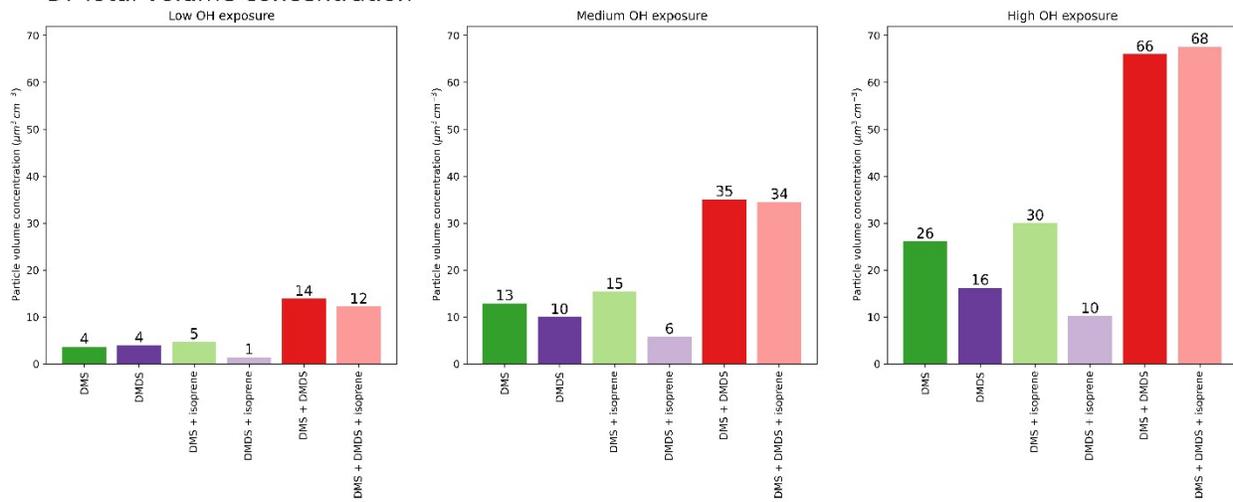
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C. Total number concentration



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D. Total volume concentration



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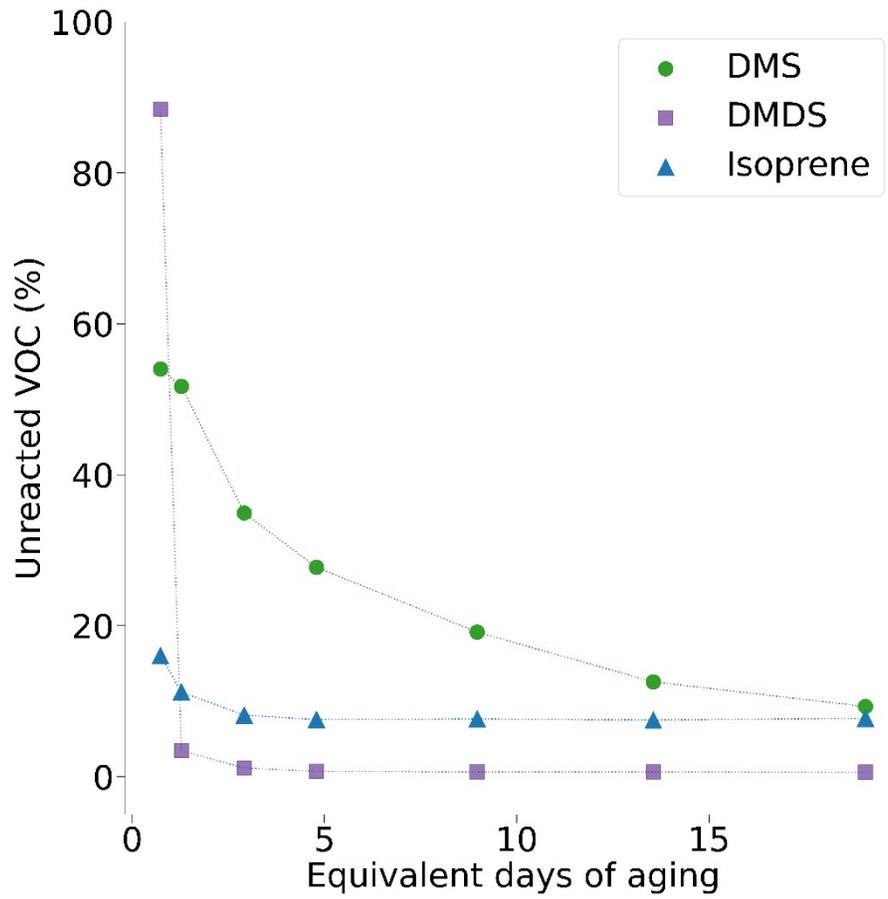
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35 Figure S3: Percent non-reacted gas for DMS, DMDS and isoprene yield experiments.

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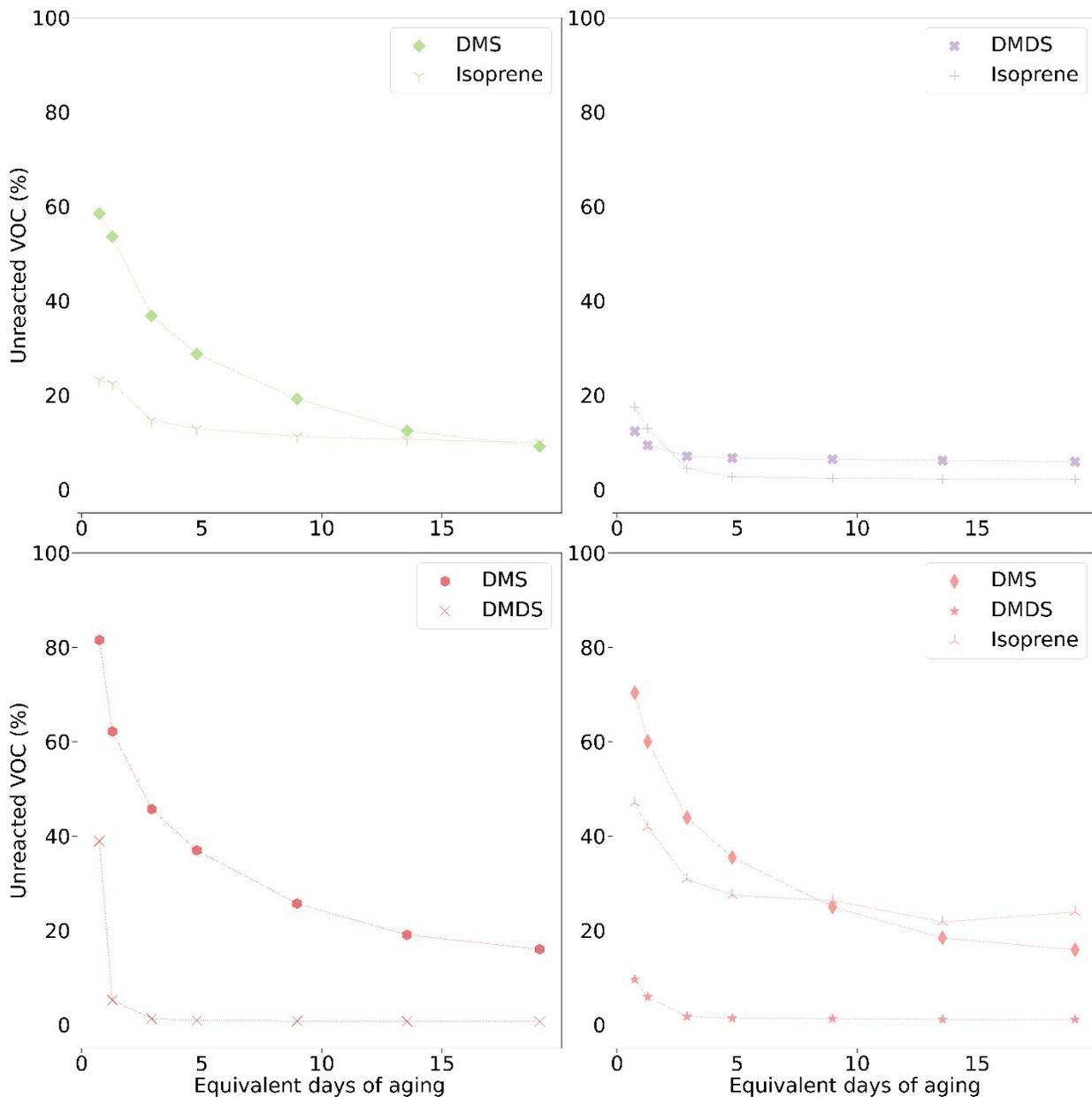
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50 Figure S4: Non-reacted gas (in %) for mixture yield experiments (left: DMS and isoprene, right:
51 DMDS and isoprene).

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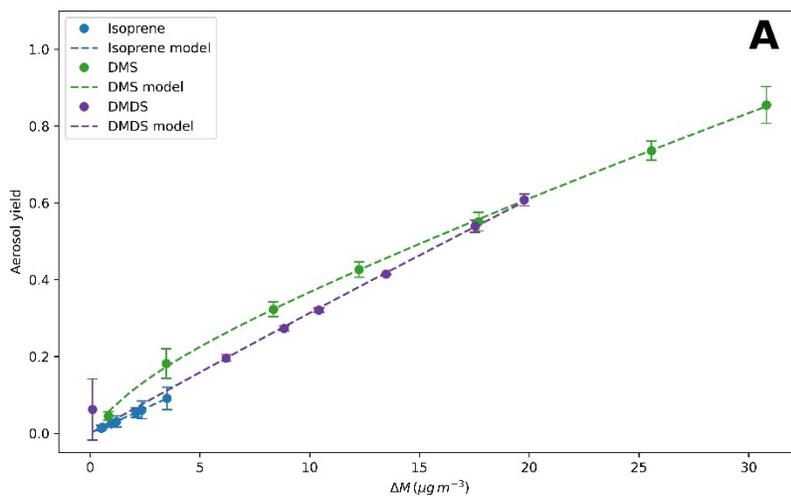
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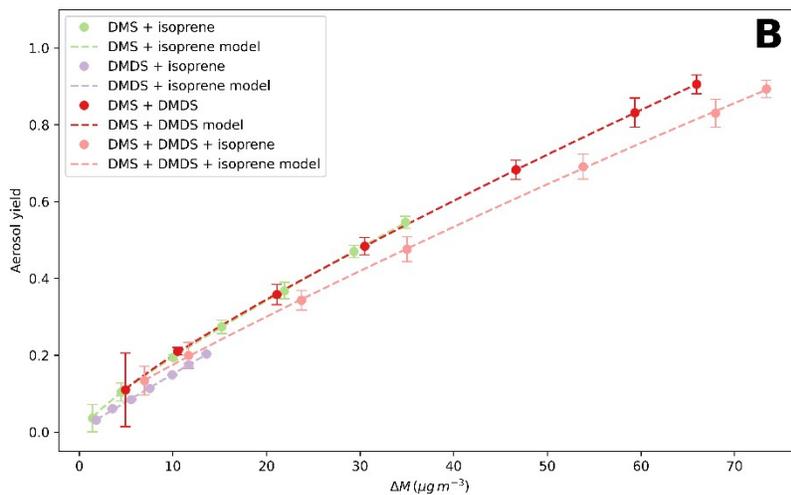
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58 Figure S5: Aerosol yields vs. aerosol mass increase for individual VOCs and mixtures. A. Pure
59 compounds. B. Mixtures. Dashed lines correspond to the fitting of the absorptive partitioning
60 model from Odum et al. (1996). Error bars represent the standard deviation of three trials.



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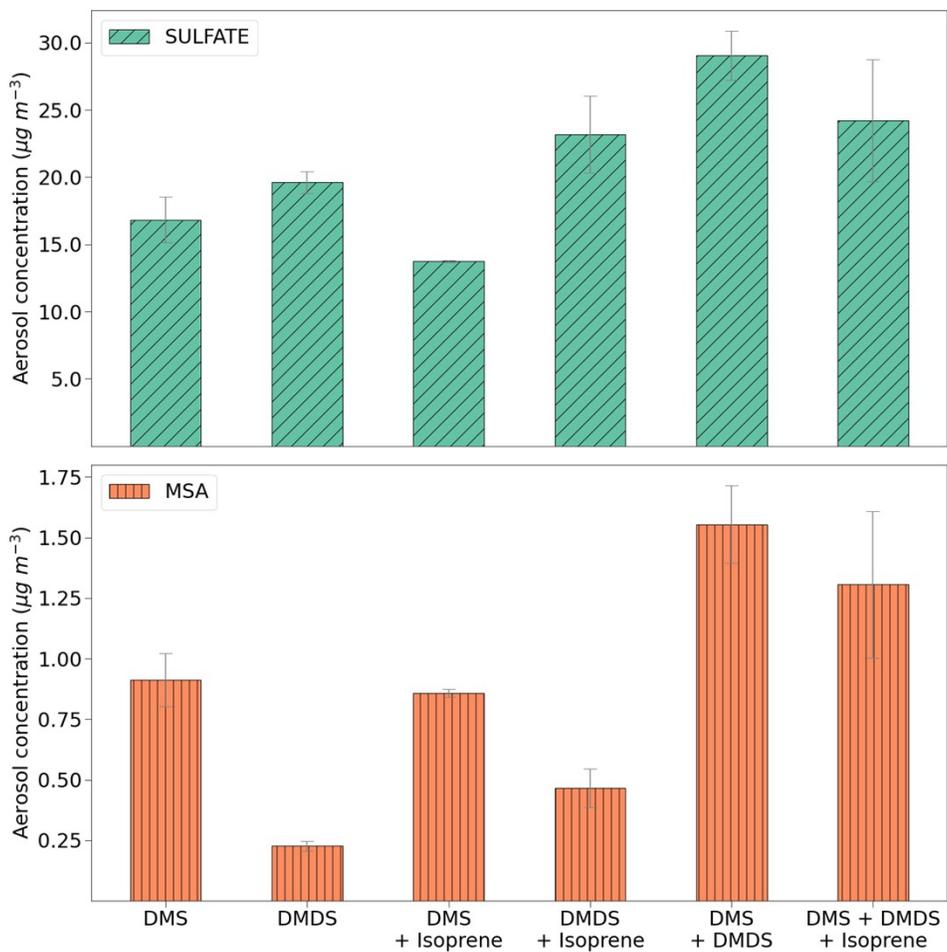
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66 Figure S6: MSA and sulfate aerosol concentrations molar fractions for DMS, DMDS, and mixtures
67 with isoprene. Error bars represent the standard deviation of four trials.

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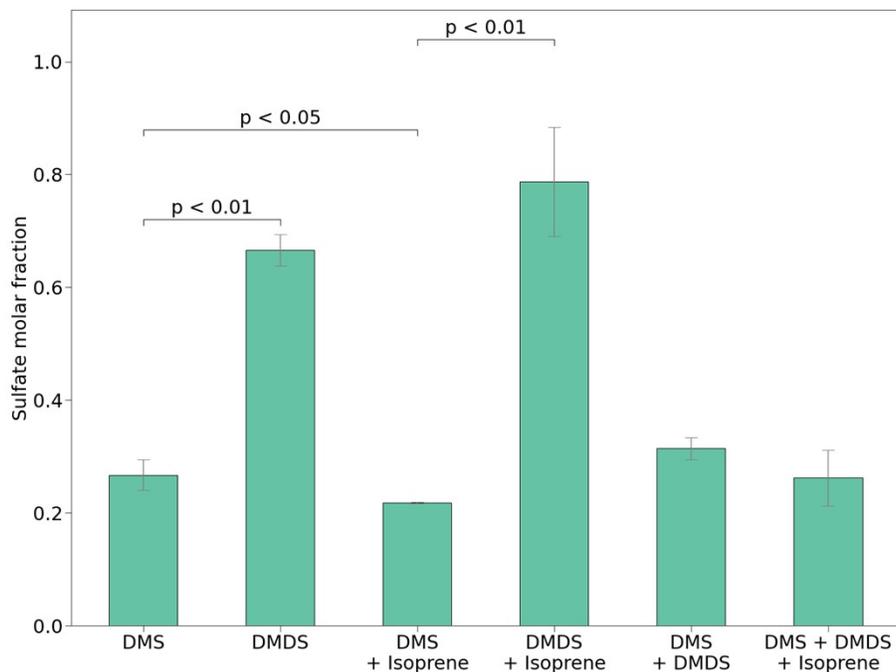


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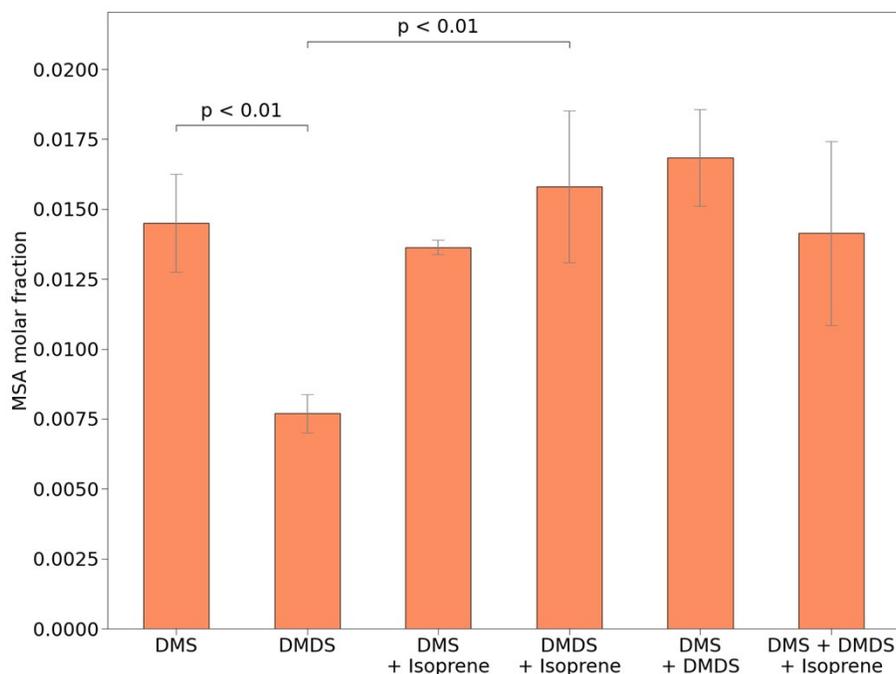
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72 Figure S7: Sulfate molar fraction for DMS, DMDS, DMS/isoprene and DMDS/isoprene
73 experiments. P-values under 0.01 and 0.05 are shown for a paired t-test (two tails). Error bars
74 represent the standard deviation of four trials.



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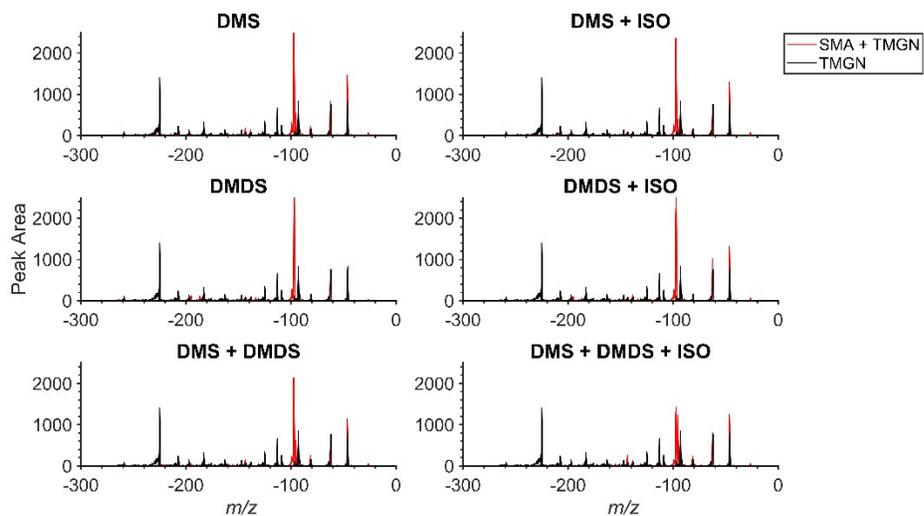
76 Figure S8: MSA molar fraction for DMS, DMDS, DMS/isoprene and DMDS/isoprene
77 experiments. P-values under 0.01 are shown for a paired t-test (two tails). Error bars represent the
78 standard deviation of four trials.



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80 Figure S9: Average mass spectra of 60 nm particles produced by various VOCs and mixtures after
81 they have been coated with matrix TMGN (red lines). Black lines represent the average spectra of
82 homogeneously nucleated TMGN particles.

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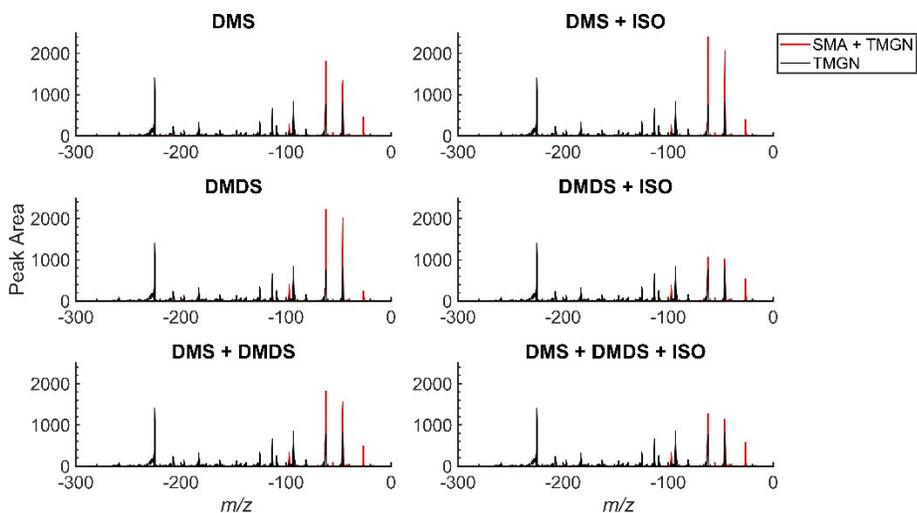


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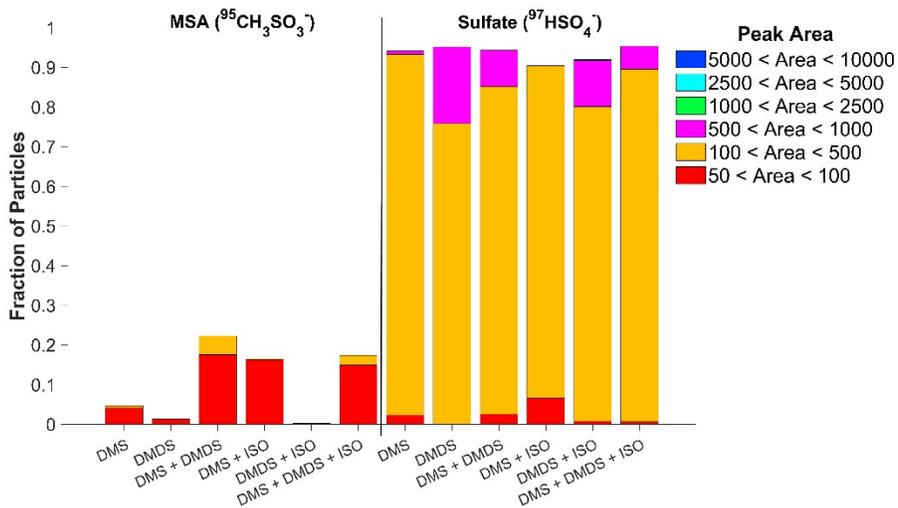
87 Figure S10: Average mass spectra of 20 nm particles produced by various VOCs and mixtures
 88 after they have been coated with matrix TMGN (red lines). Black lines represent the average
 89 spectra of homogeneously nucleated TMGN particles.



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92 Figure S11: Fraction of 20 nm particles produced by the different VOCs and mixtures that contain
 93 MSA and sulfate. Colors represent the fraction of particles that present peak areas falling in
 94 specific ranges.

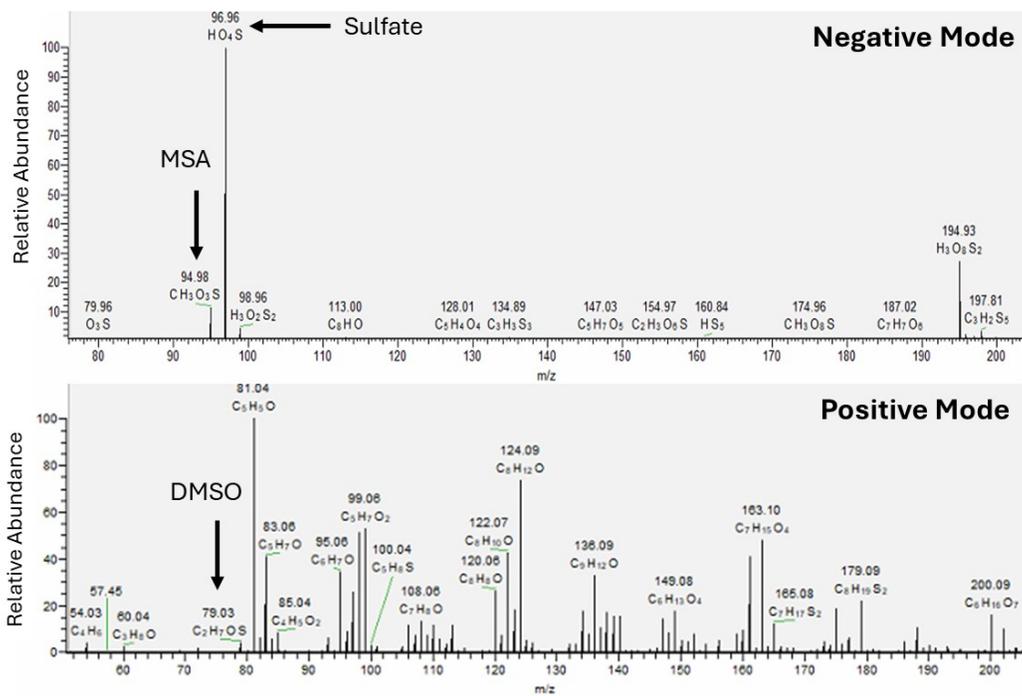
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99 Figure S12: Positive and negative mode Orbitrap spectra from the mixture of DMS, DMDS, and
100 Isoprene. Sulfate, MSA, and dimethyl sulfoxide (DMSO) have been identified.

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