Supplemental information:

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Figures and Tables

Figure S1: Purging the volatile 1,4-dihydroxy-2-methyl-2-butene impurity from *cis* β-IEPOX droplets with dry N_2 over a heated bulb (60°C) for several hours. The fraction of impurity to IEPOX, as measured by CIMS, was allowed to decay to < 2% before use for experiments.

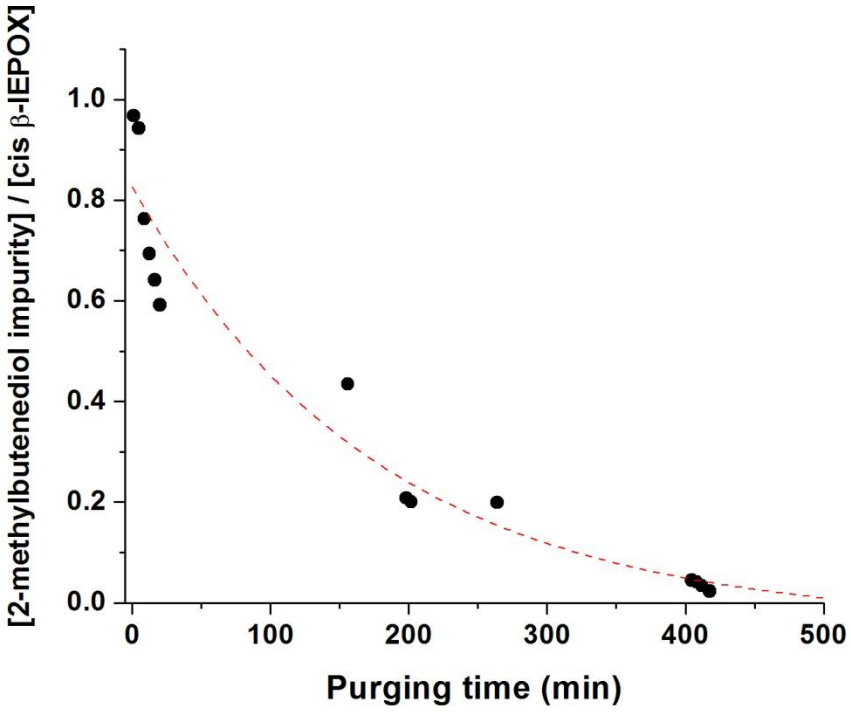

Figure S2: Vapor wall loss of *cis* β-IEPOX to the chamber walls.

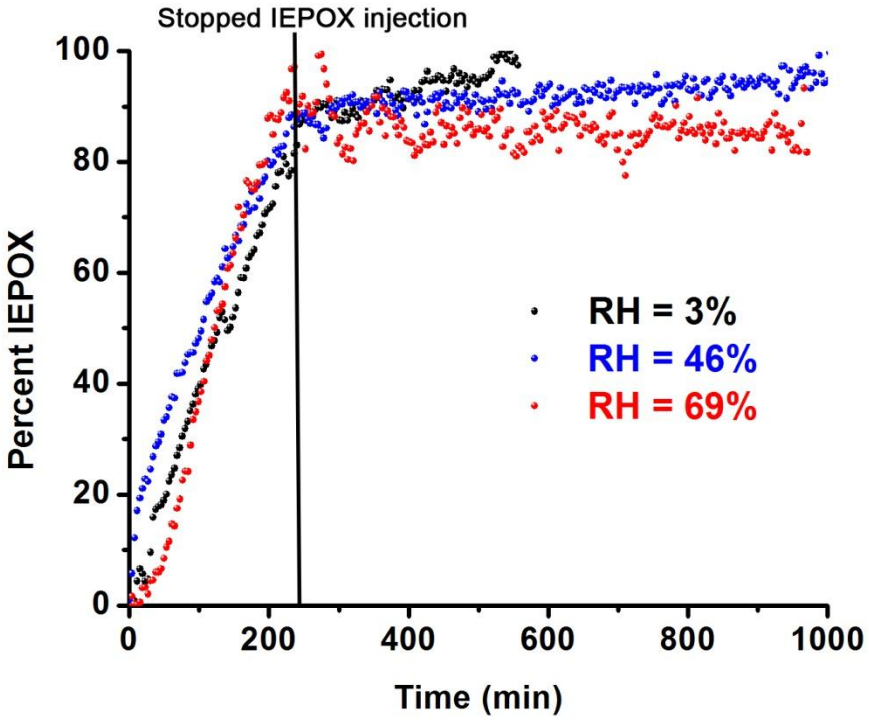

Figure S3: Top panel: OA grows in response to IEPOX gas-phase injection, but continues to grow after halting IEPOX injection, an indication that the system is not at equilibrium. Bottom panel: the ratio of the OA to gas-phase IEPOX starts off noisy and levels out as IEPOX is injected. The ratio continues to grow as gas-phase IEPOX stabilizes and OA continues to grow. The shaded panel where the ratio levels out is used in $\Phi_{OA/IEPOX}$ calculations.

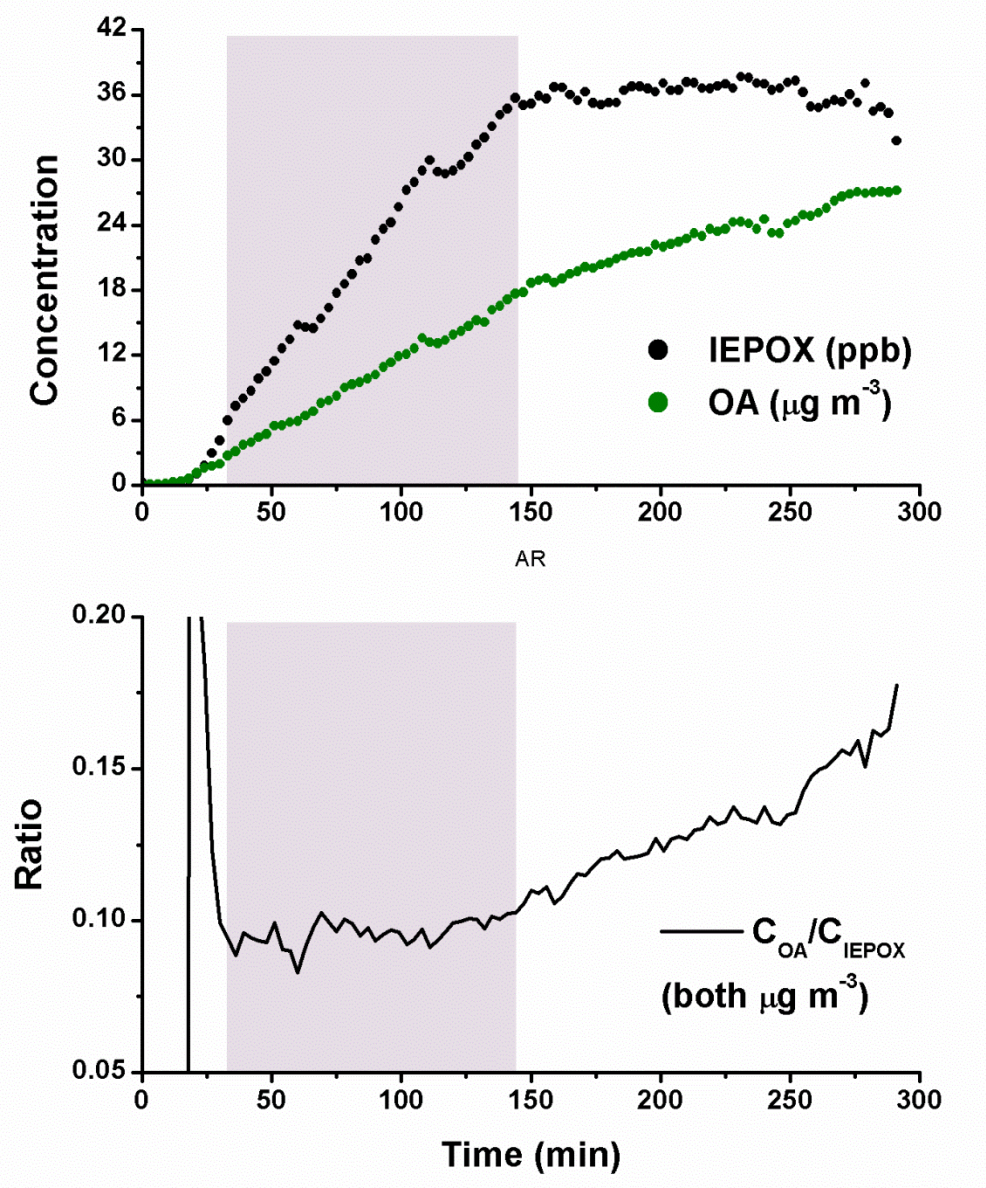

Figure S4: Typical behavior of the ratio of organic aerosol formed (detected by AMS) to gas-phase IEPOX (detected by CIMS) during the course of an experiment.

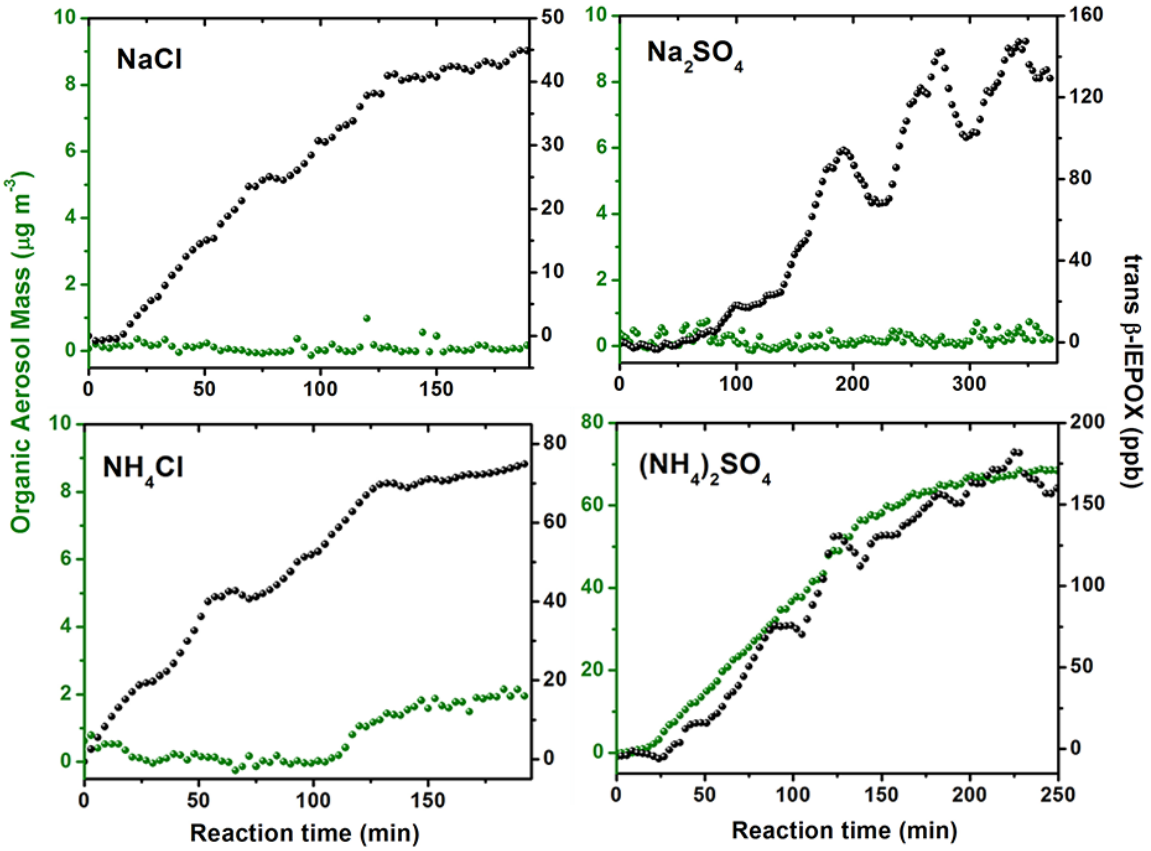

Figure S5: SMPS data showed an increase in particle volume when gas-phase IEPOX is injected onto wet NaCl seeds, which stabilizes over the course of the experiment. ToF-AMS, which sampled dried particles, did not observe OA formation – an indication that the OA is reversibly-formed in the liquid water of NaCl seeds (equilibrium partitioning) and that the un-reacted IEPOX is removed from the particle phase upon drying.

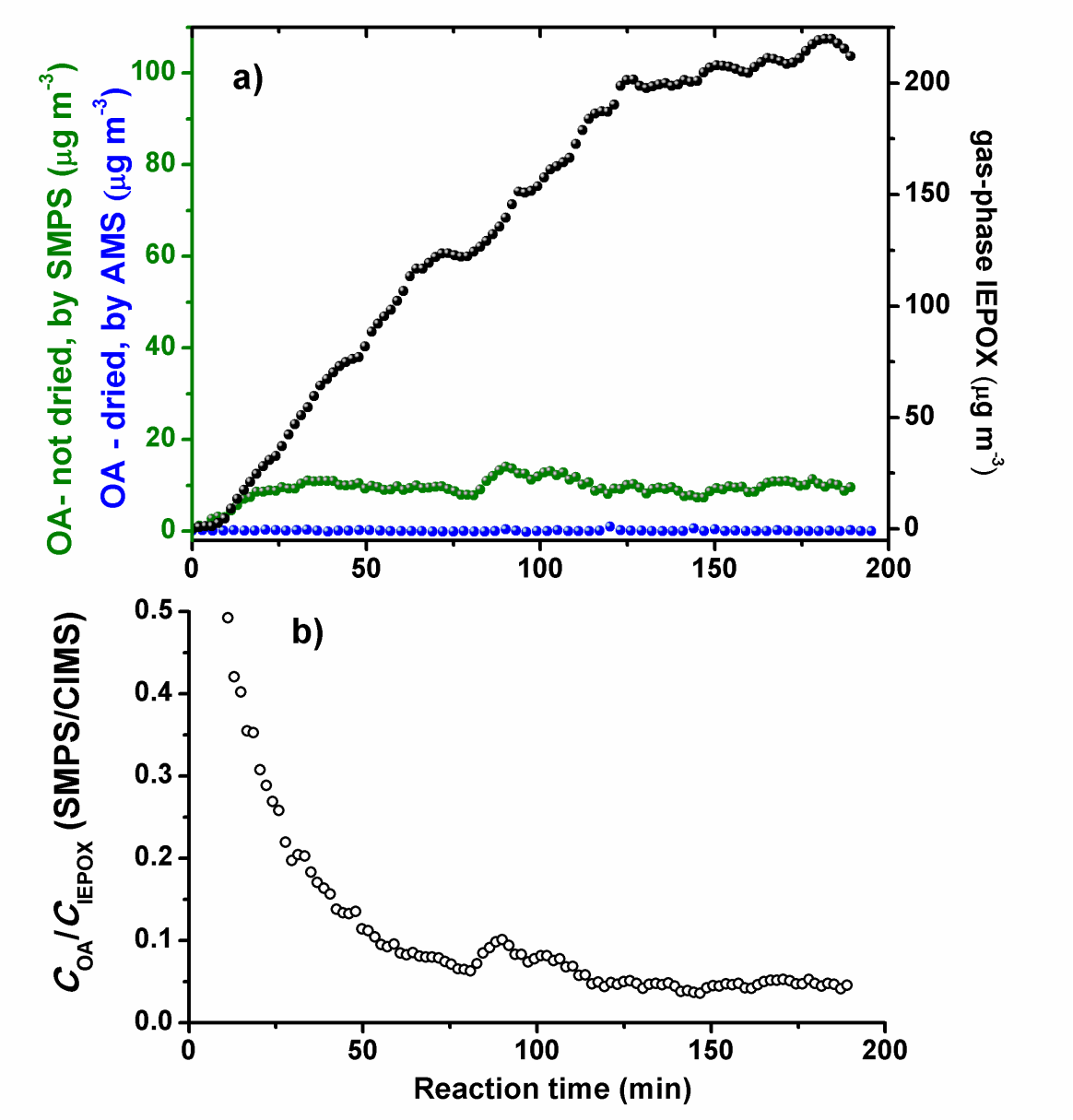

Figure S6: a) Total ion chromatogram for the IEPOX-derived OA collected onto a filter. The sharp peak at 1.36 minutes corresponds to the elution of the IEPOX-derived organosulfate. b) The mass spectrum corresponding to the 1.36 minute peak, showing that one peak ($C_5H_{11}SO_7^-$) dominates the spectrum. MSMS fragmentation (c) confirms organosulfates with the m/z 96.9581 (HSO_4^-) product ion.

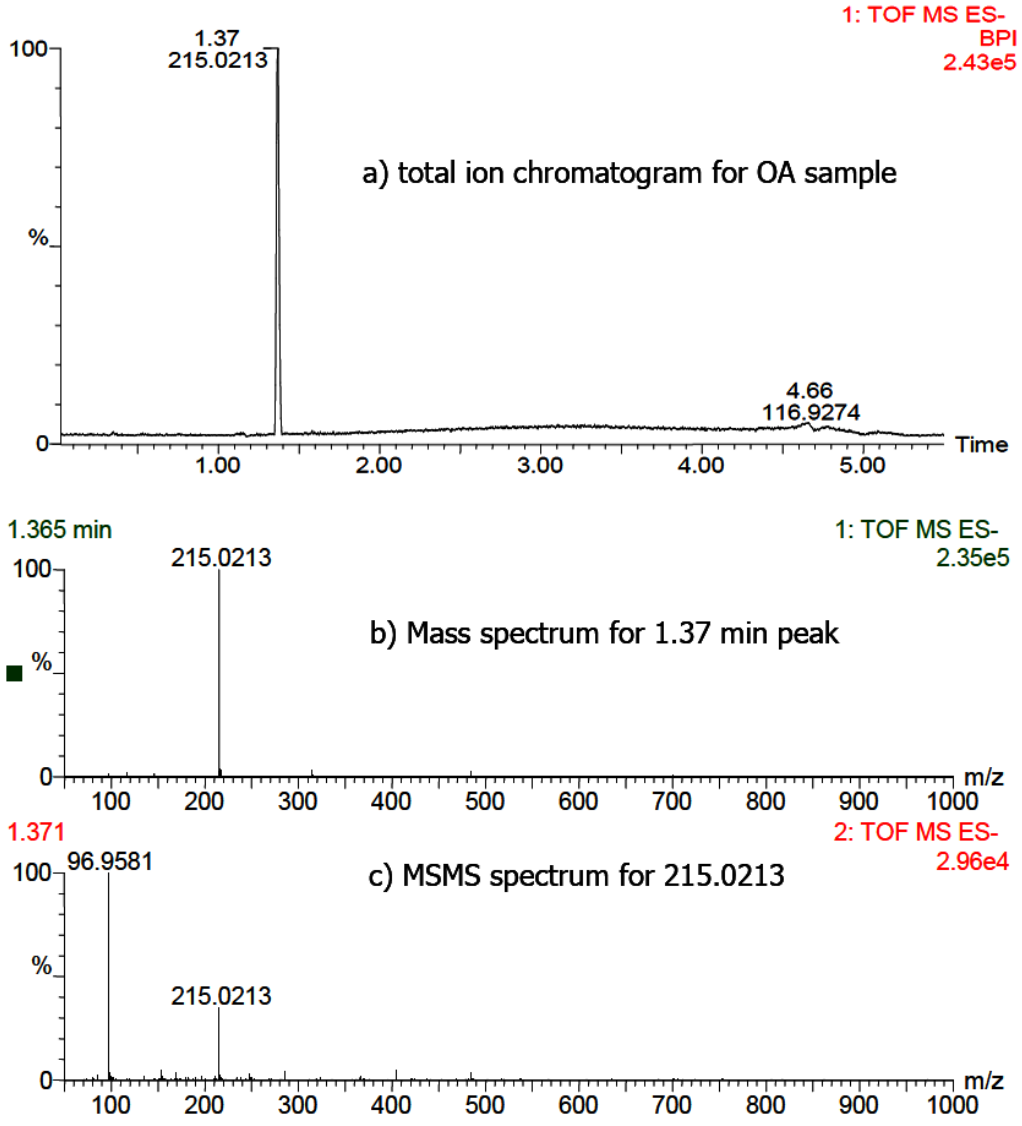

Figure S7: Proposed tracer mass fragments for IEPOX-derived OA correlate well ($R^2 > 0.99$) with the formation of OA mass.

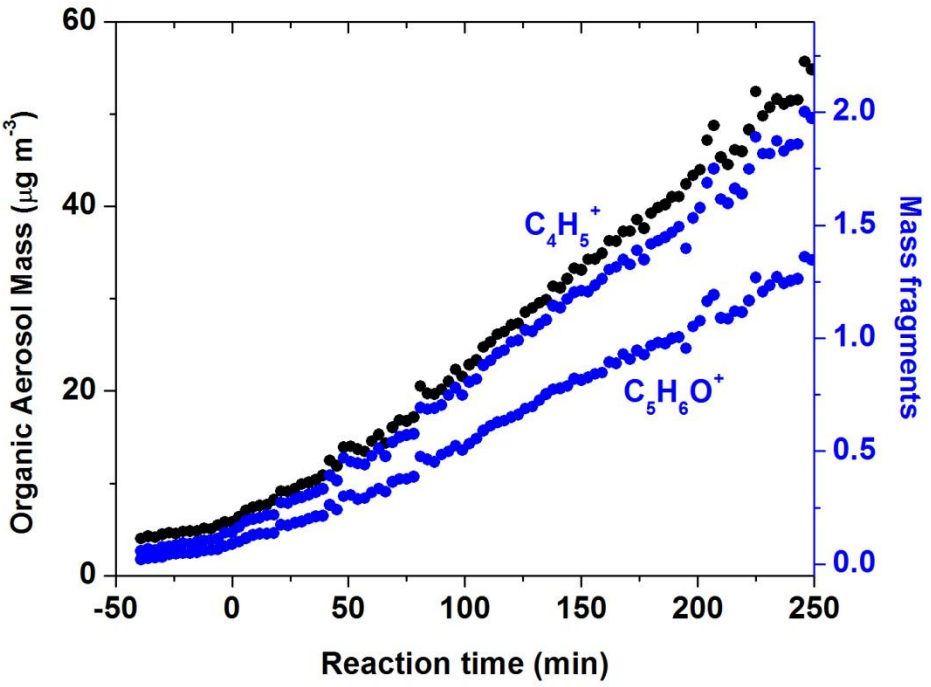

Figure S8: Correlation of four amine (C-N) fragments with the IEPOX tracer fragment ($C_5H_6O^+$) observed in ToF-AMS data for reactive uptake onto AS seeds.