



Supplement of

Laboratory studies of the aqueous-phase oxidation of polyols: submicron particles vs. bulk aqueous solution

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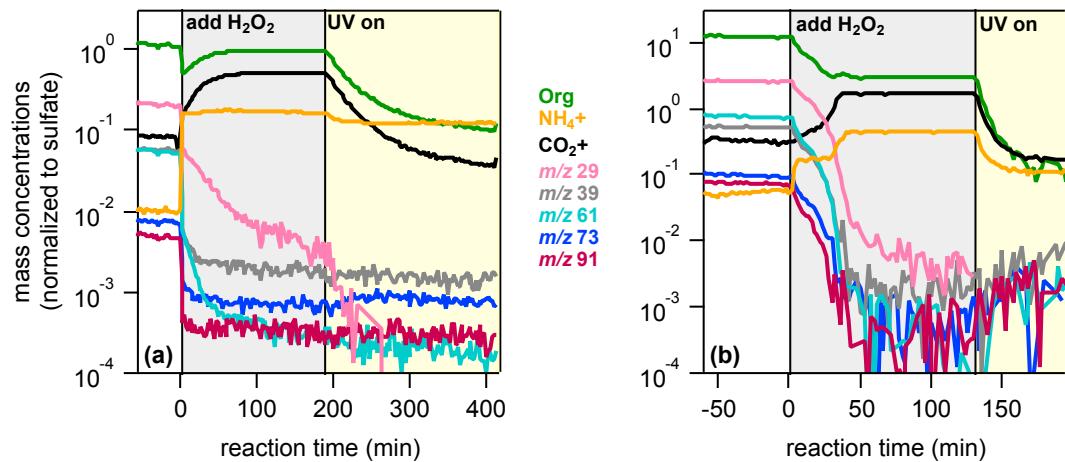


Figure S1. Results (including photolysis) for the oxidation of erythritol ($\text{C}_4\text{H}_{10}\text{O}_4$), showing sulfate-normalized mass concentrations of total organic (Org), ammonium (NH_4^+), CO_2^+ , and key ions associated with erythritol (m/z 29, 39, 61, 73, 91) as a function of reaction time for (a) bulk oxidation and (b) chamber oxidation. All data is shown in unit mass resolution, except for NH_4^+ and CO_2^+ , which are high-resolution traces. Dark Fenton chemistry is indicated by grey shading, and exposure to UV by yellow shading.

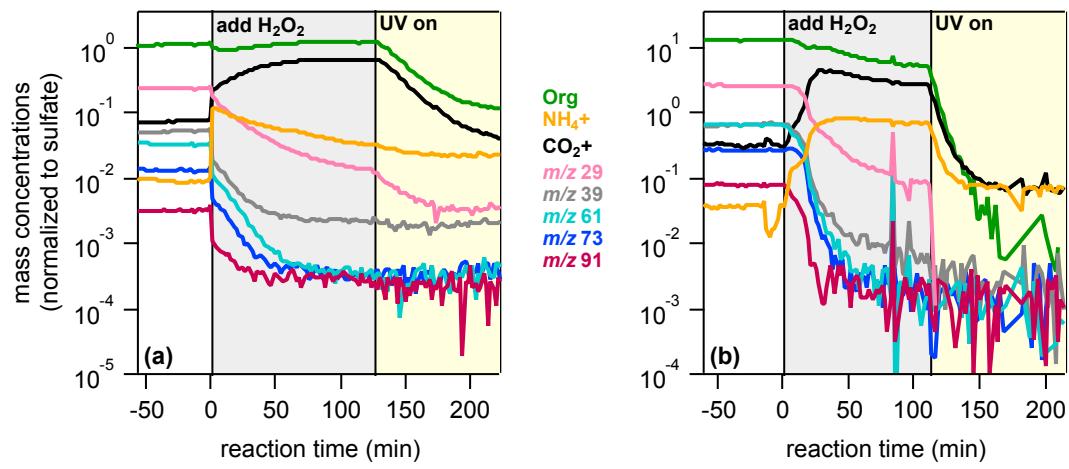


Figure S2. Same as Figure S1, but for the oxidation of adonitol ($C_5H_{12}O_5$).

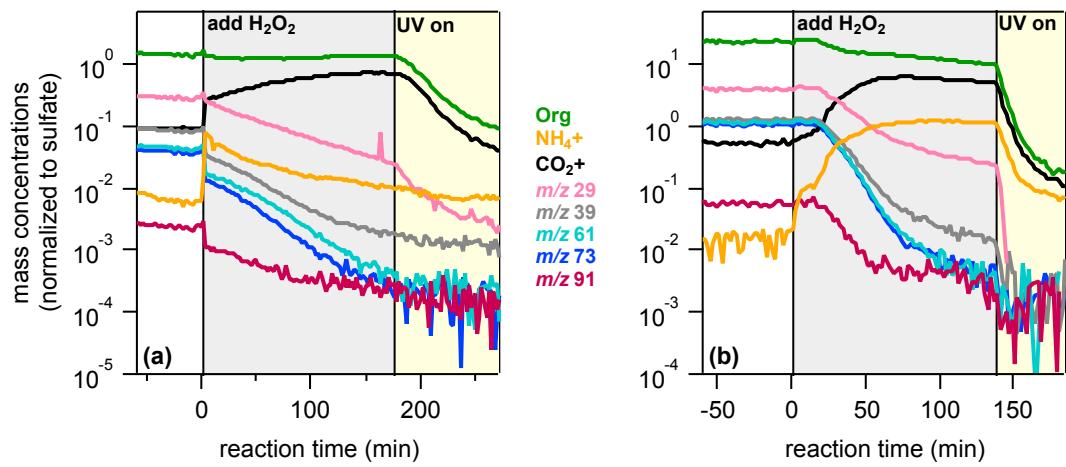


Figure S3. Same as Figure S1, but for the oxidation of mannitol ($C_6H_{14}O_6$).

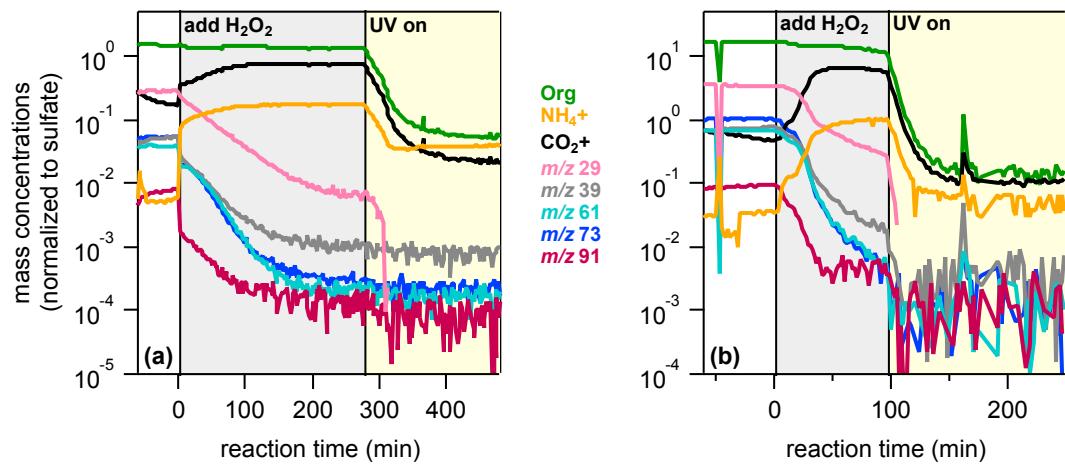


Figure S4. Same as Figure S1, but for the oxidation of volemitol ($C_7H_{16}O_7$).

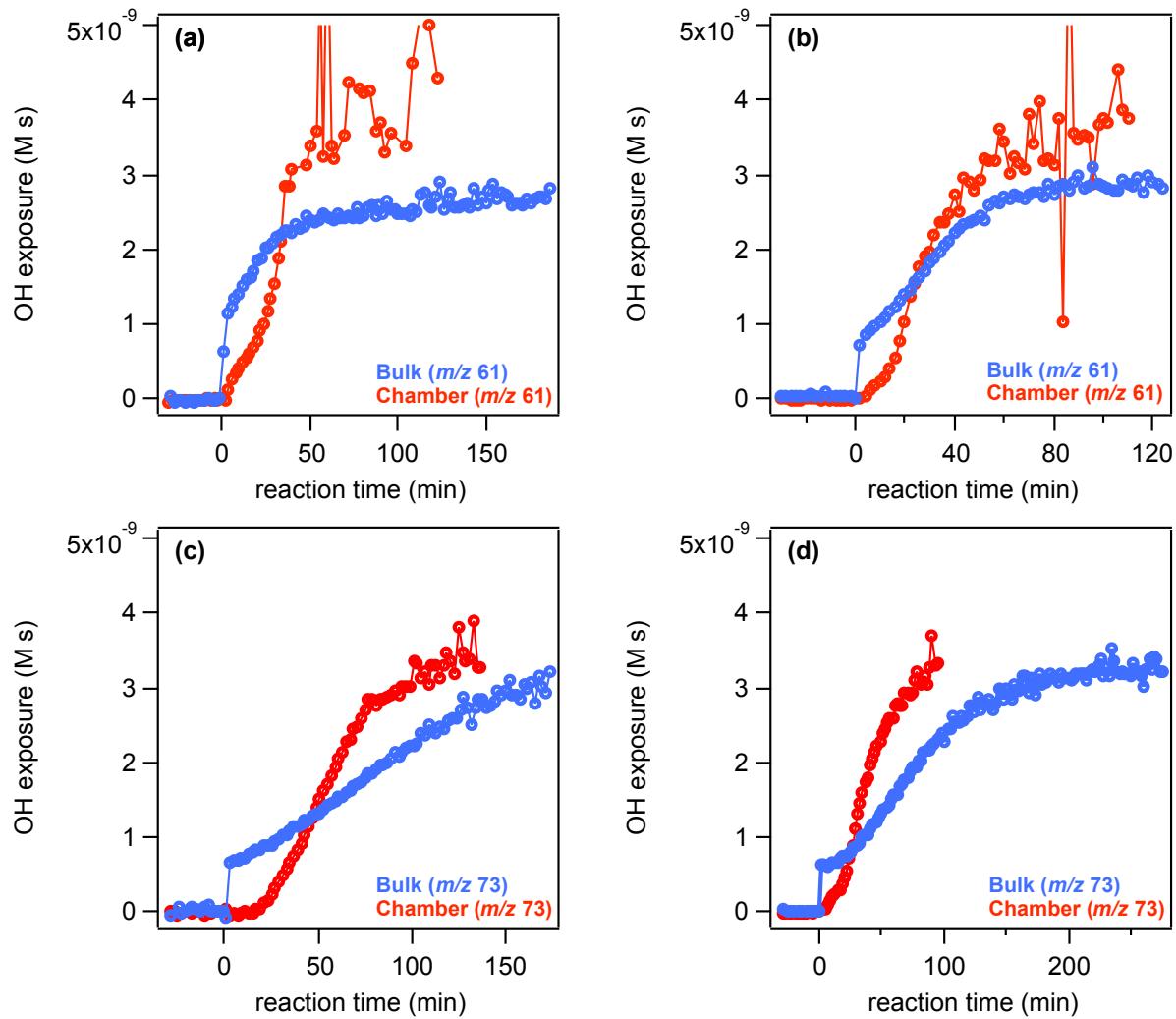


Figure S5. Estimated OH exposures for all experiments. These are determined from OH exposure = $\ln([polyol]_0/[polyol]_t)/k_{OH}$, where $[polyol]_0$ and $[polyol]_t$ are the sulfate-normalized mass concentrations of the fastest decaying tracer ion at times 0 and t, respectively, and k_{OH} is the rate constant for aqueous reaction with OH (Herrmann et al., 2010). OH exposures for both bulk and chamber oxidation are shown as a function of time from 30 min prior to adding H_2O_2 until exposure to UV lights for (a) erythritol using m/z 61 as a tracer and $k_{OH} = 1.9 \times 10^9 \text{ M}^{-1} \text{ s}^{-1}$, (b) adonitol using m/z 61 as a tracer and $k_{OH} = 1.6 \times 10^9 \text{ M}^{-1} \text{ s}^{-1}$, (c) mannitol using m/z 73 as a tracer and $k_{OH} = 1.6 \times 10^9 \text{ M}^{-1} \text{ s}^{-1}$, and (d) volemitol using m/z 73 as a tracer and $k_{OH} = 1.6 \times 10^9 \text{ M}^{-1} \text{ s}^{-1}$. (Because no k_{OH} has been reported for volemitol, it was assumed to be equal to the k_{OH} for mannitol.)