Supplement to: HO_x and NO_x production in oxidation flow reactors via photolysis of isopropyl nitrite, isopropyl nitrite-d₇, and 1,3-propyl dinitrite at $\lambda = 254, 350$, and 369 nm

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Figure S1. (a) NO_2 quantum yield (b) iPrONO and NO_2 absorption cross section (c) relative output of lamps used for alkyl nitrite or NO_2 photolysis / residence time distribution measurements as a function of wavelength. Areas under the lamp emission spectra are normalized to be the same value for each lamp type.

Figure S2. Residence time distributions in the PAM oxidation flow reactor obtained using 10-second pulsed inputs of NO₂ in the presence of four lamps centered at $\lambda = 658$ nm that were turned off (blue symbols) or on (red symbols). Black traces representing Taylor dispersion curves are shown to guide the eye (Lambe et al., 2011; Huang et al., 2017).

Figure S3. NO₂ decay and NO formation in the reactor as a function of UV irradiance at $\lambda = 254, 350$ or 369 nm. Measurements were conducted in the absence of oxygen to avoid O₃ formation.

Figure S4. Calibrated OH_{exp} obtained following reaction of 493 ppb SO₂ with OH generated via O₃ + hν₂₅₄ → O(¹D) + O₂ followed by O(¹D) + H₂O → 2OH in the absence of NO_x. The reactor was operated at the same residence time used in alkyl nitrite experiments. Particulate sulfate was measured with an Aerodyne Chemical Speciation Monitor. For details see Sect. 2.2.

Figure S5. Sulfate measured by ACSM as a function of SO₂ mixing ratio input to the reactor.

Chilled (solid blue)

Slightly warmed

Room temperature

Figure S6. Photographs showing product of attempted hexafluoroisopropyl nitrite synthesis. Sulfuric acid was added to a slurry of 8.5 g sodium nitrite and 20 g hexafluoroisopropanol under nitrogen. Outflow from the synthesis flask was collected in a cold trap held in a dry ice/acetone bath.

Figure S7. Comparison of OH_{exp} and NO_2 values obtained from estimation equations and photochemical model for (a-b) OFR369-i(iPrONO) and (c-d) OFR369-i(iPrONO-d₇).

References

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