Supplement of

Real-Time Measurement of NO and NH_3 Concentration Variations Using Direct Absorption Spectroscopy in the Smog Chamber to Analyze NH_4NO_3 Photochemical Formation Characteristics

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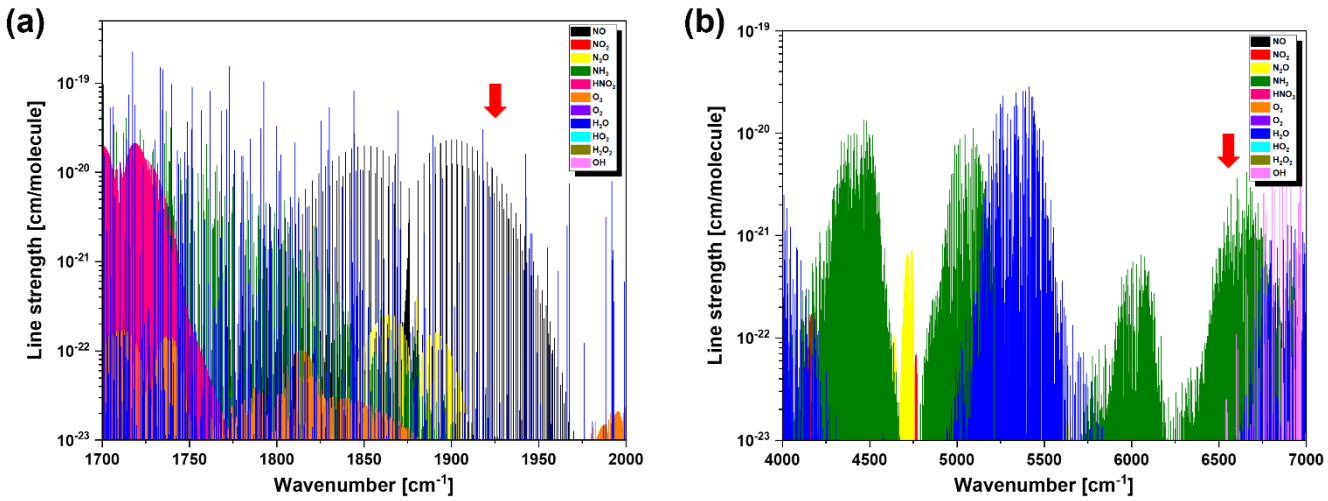

Figure S1: (a) Absorption line strength of reactants and products from NH_4NO_3 photochemical chemistry in the 1700 to 2000 cm^{-1} spectral range, (b) Absorption line strength of reactants and products from NH_4NO_3 photochemical chemistry in the 4000 to 7000 cm^{-1} spectral range based on HITRAN2016 database.

Table S1: The primary photochemical reactions and rate constant participating in the NH_4NO_3 formation process for Ox, HOx, and NOx.

Reaction number	Photochemical reactions	Rate constant, 298K $[cm^3 \cdot molecule^{-1} \cdot s^{-1}]$
(1)	$O_2 + \cdot O + M \rightarrow O_3 + M$	5.6×10^{-34}
(2)	$\cdot O + O_3 \rightarrow 2O_2$	8.0×10^{-15}
(3)	$\cdot OH + O_3 \rightarrow \cdot HO_2 + O_2$	7.3×10^{-14}
(4)	$\cdot O + \cdot HO_2 \rightarrow \cdot OH + O_2$	5.8×10^{-11}
(5)	$\cdot OH + \cdot OH \rightarrow H_2O + \cdot O$	1.48×10^{-12}
(6)	$\cdot O + NO + M \rightarrow NO_2 + M$	3.0×10^{-11}
(7)	$\cdot O + NO_2 \rightarrow O_2 + NO$	1.0×10^{-11}
(8)	$\cdot O + NO_2 + M \rightarrow NO_3 + M$	2.3×10^{-11}
(9)	$\cdot OH + \cdot HONO \rightarrow H_2O + NO_2$	6.0×10^{-12}
(10)	$\cdot OH + NO + M \rightarrow \cdot HONO + M$	3.3×10^{-11}
(11)	$\cdot OH + NH_3 \rightarrow H_2O + NH_2$	1.6×10^{-13}
(12)	$NO_2 + H_2O \rightarrow \cdot HONO$	2.4×10^{-23} (variable)
(13)	$NO + NO_2 + H_2O \rightarrow \cdot HONO + \cdot HONO$	6.0×10^{-38} $[cm^6 \cdot molecule^{-2} \cdot s^{-1}]$
(14)	$\cdot OH + NO_3 \rightarrow \cdot HO_2 + NO_2$	2.0×10^{-11}
(15)	$\cdot HO_2 + NO \rightarrow \cdot OH + NO_2$	8.8×10^{-12}
(16)	$2NO + O_2 \rightarrow 2NO_2$	2.0×10^{-38} $[cm^6 \cdot molecule^{-2} \cdot s^{-1}]$
(17)	$NO + O_3 \rightarrow NO_2 + O_2$	1.8×10^{-14}
(18)	$NO + NO_3 \rightarrow 2NO_2$	2.6×10^{-11}
(19)	$NO_2 + O_3 \rightarrow NO_3 + O_2$	3.5×10^{-17}
(20)	$NO_2 + \cdot OH + M \rightarrow HNO_3 + M$	4.1×10^{-11}
(21)	$NO_2 + NO_3 + M \rightarrow N_2O_5 + M$	1.9×10^{-12}
(22)	$N_2O_5 + H_2O \rightarrow 2HNO_3$	2.0×10^{-21}
(23)	$HNO_3 + NH_3 \rightarrow NH_4NO_{3(s)}$	$10^{-11} \sim 10^{-17}$ (variable)