

Chemical Composition of Gas and Particle Phase Products of Toluene Photooxidation Reaction under High OH Exposure Condition

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Table S1. Experiment list for gas phase product study.

VOC	RH (%)	OH exposure (1 × 10 ¹² molec cm ⁻³ s)	Seed particle
Toluene	17	0.40	-
		0.55	-
		0.65	-
		0.75	-
	36	0.56	-
		0.82	-
		0.95	-
		1.05	-
	60	0.76	-
		1.07	-
		1.30	-
		1.44	-
	34	0.45	(NH ₄) ₂ SO ₄
		0.78	(NH ₄) ₂ SO ₄
		0.89	(NH ₄) ₂ SO ₄
		1.03	(NH ₄) ₂ SO ₄
	62	0.54	(NH ₄) ₂ SO ₄
		0.75	(NH ₄) ₂ SO ₄
		0.93	(NH ₄) ₂ SO ₄
		1.03	(NH ₄) ₂ SO ₄

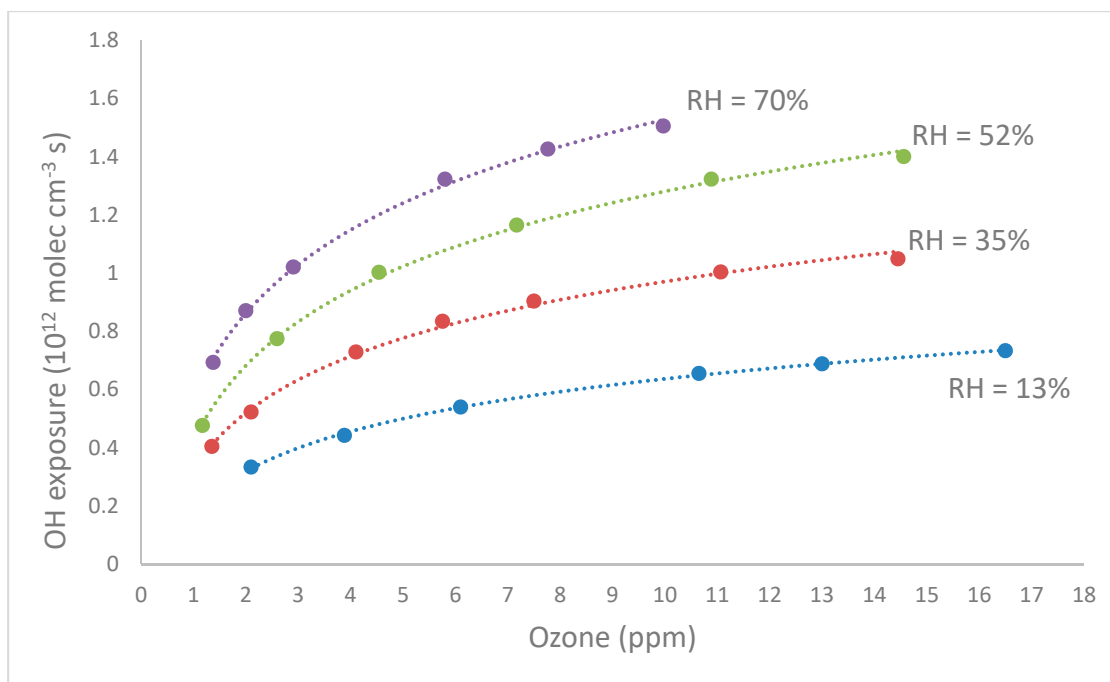


Figure S1. Calibration curve of OH exposure under different RH

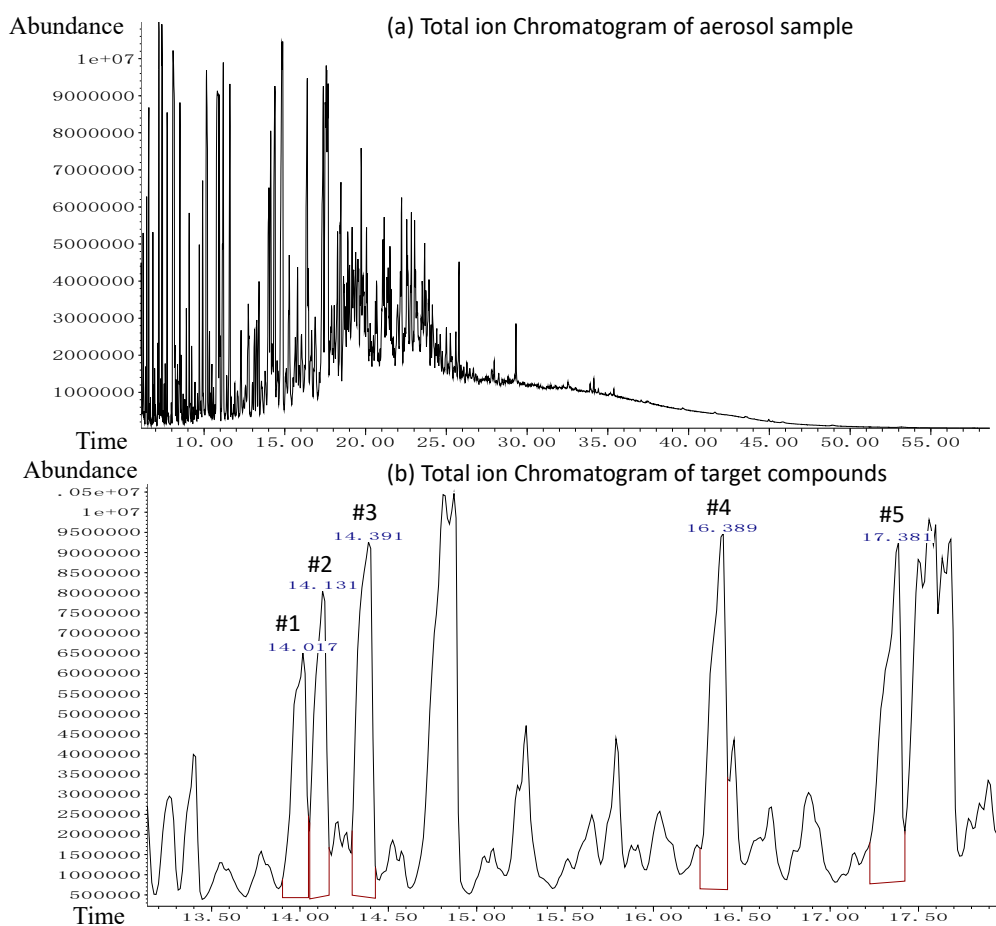


Figure S2. Total ion chromatogram of aerosol samples and target compounds. Target Compounds: #1, Citramalic acid; #2, 2,3-Dihydroxy-4-oxopentanoic acid; #3, Malic acid; #4, Tartaric acid; #5, 2,3-dihydroxy-glutaric acid.

Table S2. Dot products between spectrums obtained in each experiment. The unit of OH exposure is 1×10^{12} molec cm^{-3} s. Areas in grey represent dot products between experiments of different RH, and areas in light brown represent dot products between experiments with and without using seed particles.

RH		17%				36%				60%				34% (seed)				62% (seed)			
	OH exp	0.4	0.55	0.65	0.75	0.56	0.82	0.95	1.05	0.76	1.07	1.3	1.44	0.45	0.78	0.89	1.03	0.54	0.75	0.93	1.03
17%	0.4	1.00	0.97	0.93	0.89	0.94	0.90	0.88	0.84	0.91	0.88	0.86	0.84	0.82	0.79	0.78	0.78	0.75	0.76	0.76	0.76
	0.55	-	1.00	0.99	0.97	0.98	0.96	0.95	0.94	0.95	0.95	0.94	0.93	0.82	0.81	0.82	0.83	0.77	0.80	0.80	0.81
	0.65	-	-	1.00	0.99	0.98	0.98	0.98	0.97	0.95	0.96	0.96	0.96	0.76	0.77	0.79	0.81	0.73	0.77	0.77	0.79
	0.75	-	-	-	1.00	0.96	0.98	0.99	0.99	0.94	0.97	0.98	0.98	0.73	0.74	0.76	0.80	0.70	0.74	0.75	0.78
36%	0.56					1.00	0.98	0.97	0.95	0.99	0.98	0.97	0.95	0.76	0.75	0.76	0.78	0.72	0.74	0.75	0.76
	0.82					-	1.00	1.00	0.99	0.98	0.99	0.99	0.99	0.75	0.76	0.78	0.81	0.73	0.77	0.78	0.80
	0.95					-	-	1.00	0.99	0.97	0.99	1.00	0.99	0.72	0.74	0.76	0.79	0.70	0.74	0.75	0.78
	1.05					-	-	-	1.00	0.95	0.98	0.99	1.00	0.70	0.73	0.75	0.79	0.70	0.74	0.75	0.78
60%	0.76									1.00	0.99	0.97	0.95	0.73	0.72	0.73	0.75	0.69	0.71	0.72	0.73
	1.07									-	1.00	0.99	0.98	0.73	0.74	0.75	0.78	0.71	0.74	0.75	0.77
	1.3									-	-	1.00	0.99	0.71	0.72	0.74	0.78	0.69	0.73	0.75	0.77
	1.44									-	-	-	1.00	0.68	0.71	0.73	0.77	0.68	0.72	0.73	0.76
34% (seed)	0.45													1.00	0.99	0.98	0.97	0.98	0.97	0.97	0.95
	0.78													-	1.00	1.00	0.99	0.99	0.99	0.99	0.98
	0.89													-	-	1.00	1.00	0.99	1.00	0.99	0.99
	1.03													-	-	-	1.00	0.98	0.99	0.99	0.99
62% (seed)	0.54																	1.00	1.00	0.99	0.99
	0.75																	-	1.00	1.00	0.99
	0.93																	-	-	1.00	1.00
	1.03																	-	-	-	1.00