

Supplemental Material for  
“Generation of Hydroxyl Radicals from Ambient Fine Particles  
in a Surrogate Lung Fluid Solution”

by Edgar Vidrio, Chin Phuah, Ann M. Dillner and Cort Anastasio  
University of California - Davis

Revised Version Submitted to Environmental Science & Technology, November 20, 2008

This supplemental material contains 6 pages, composed of this cover page, two figures, and 3 tables.

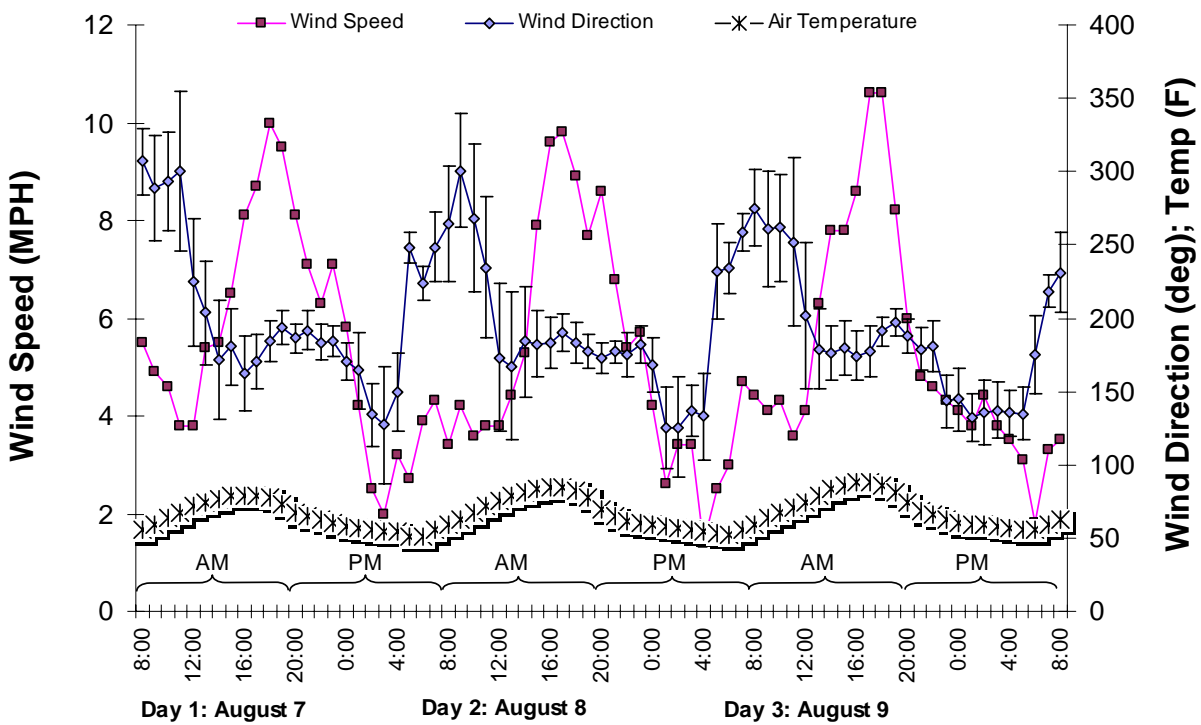


Figure S1. Wind speed, direction, and air temperature for PM<sub>2.5</sub> samples collected from August 7th to 9th 2007 (see Figure 2 in text for OH data).

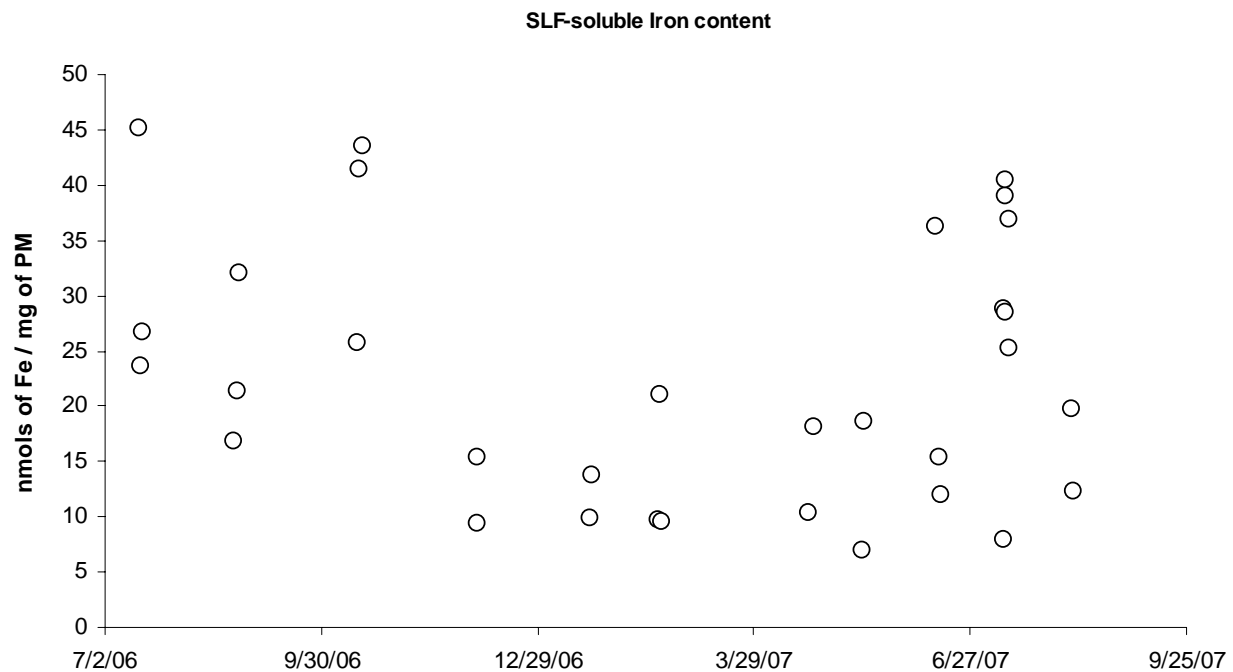


Figure S2. PM-mass-normalized SLF-soluble iron as a function of sampling date.

Table S1. Total and surrogate lung fluid (SLF)-soluble metal concentrations in PM<sub>2.5</sub> samples determined by XRF and ICP-MS analysis. Units are nmol-metal mg<sup>-1</sup>-PM<sub>2.5</sub> with variability of 1σ.

Metal	Total element content				SLF-soluble element content			
	Spring (n = 9)	Summer (n = 33)	Fall (n = 3)	Winter (n = 10)	Spring (n = 9)	Summer (n = 33)	Fall (n = 3)	Winter (n = 9)
Aluminum	300 ± 23	360 ± 24	729 ± 43	150 ± 12	185 ± 69	48 ± 29	101 ± 50	126 ± 46
Silicon	817 ± 44	792 ± 17	2061 ± 105	422 ± 23	n/a	n/a	n/a	n/a
Phosphorus	61 ± 7	6.9 ± 0.7	24 ± 3	15 ± 1	n/a	n/a	n/a	n/a
Sulfur	1931 ± 98	2005 ± 102	1336 ± 68	608 ± 31	n/a	n/a	n/a	n/a
Chlorine	394 ± 21	150 ± 10	22 ± 2	177 ± 9	n/a	n/a	n/a	n/a
Potassium	285 ± 11	141 ± 4	318 ± 12	144 ± 4	n/a	n/a	n/a	n/a
Calcium	210 ± 11	169 ± 9	214 ± 11	94 ± 5	n/a	n/a	n/a	n/a
Titanium	13 ± 1	14 ± 0.1	26 ± 1	6 ± 1	n/a	n/a	n/a	n/a
Vanadium	3.2 ± 0.4	3.8 ± 0.4	2.7 ± 0.4	1.6 ± 0.2	0.5 ± 0.4	1.4 ± 0.8	0.5 ± 0.4	0.1 ± 0.06
Chromium	1.0 ± 0.1	0.9 ± 0.2	1.3 ± 0.2	0.7 ± 0.1	n/a	n/a	n/a	n/a
Manganese	5.0 ± 0.3	4.6 ± 0.3	9.8 ± 0.6	3.1 ± 0.2	2.9 ± 1.8	2.7 ± 2.0	4.0 ± 4.3	3.0 ± 1.5
Iron	183 ± 9	245 ± 12	360 ± 17	152 ± 7	18 ± 11	26 ± 13	37 ± 10	13 ± 4
Nickel	0.6 ± 0.1	1.2 ± 0.1	0.9 ± 0.1	0.2 ± 0.0	n/a	n/a	n/a	n/a
Copper	3.7 ± 0.3	3.0 ± 0.2	2.9 ± 0.2	3.9 ± 0.2	1.6 ± 1.3	0.9 ± 0.7	2.3 ± 0.0	2.5 ± 1.9
Zinc	9.6 ± 0.5	7.0 ± 0.4	5.9 ± 0.4	9.1 ± 0.5	2.9 ± 1.7	4.1 ± 5.9	1.3 ± 0.3	3.9 ± 2.1
Arsenic	0.2 ± 0.1	0.0 ± 0.0	0.0 ± 0.0	0.2 ± 0.1	n/a	n/a	n/a	n/a
Cobalt	n/a	n/a	n/a	n/a	0.2 ± 0.1	0.1 ± 0.04	0.2 ± 0.1	0.1 ± 0.05

Table S2. Element correlations with OH generation segregated by season. The OH and metal amounts in the correlations were both expressed in units of nmol filter<sup>-1</sup>.

	Correlation with OH generation ( $r^2$ ) with...							
	Total element (by XRF)				SLF-soluble element (by ICP-MS)			
	Overall (n)	Spring (41-43)	Summer (5-6)	Winter (26-27)	Overall (31-35)	Spring (6)	Summer (14-18)	Winter (8)
Aluminum	0.06	0.15	0.05	0.81	0.05	0.10	0.03	0.22
Silicon	0.01	0.09	0.00	0.06	n/a	n/a	n/a	n/a
Sulfur	0.04	0.14	0.03	0.02	n/a	n/a	n/a	n/a
Calcium	0.01	0.05	0.05	0.26	n/a	n/a	n/a	n/a
Vanadium	0.22	0.10	0.24	0.92	0.22	0.15	0.26	0.17
Chromium	0.04	0.46	0.00	0.00	n/a	n/a	n/a	n/a
Manganese	0.10	0.10	0.09	0.94	0.13	0.21	0.00	0.39
Iron	0.13	0.31	0.12	0.97	0.11	0.03	0.07	0.55
Nickel	0.06	0.48	0.02	0.08	n/a	n/a	n/a	n/a
Copper	0.13	0.18	0.10	0.99	0.01	0.03	0.02	0.40
Zinc	0.11	0.17	0.02	0.93	0.07	0.39	0.07	0.47
Cobalt	n/a	n/a	n/a	n/a	0.47	0.38	0.54	0.84

Table S3. Element correlations with OH generation segregated by season. The OH and metal amounts in the correlations were both expressed in units of nmol mg<sup>-1</sup>-PM.

	Correlation with OH generation (r <sup>2</sup> ) with...							
	Total element (by XRF)				SLF-soluble element (by ICP-MS)			
	Overall	Spring	Summer	Winter	Overall	Spring	Summer	Winter
Aluminum	0.01	0.15	0.00	0.25	0.00	0.03	0.06	0.19
Silicon	0.01	0.19	0.00	0.10	n/a	n/a	n/a	n/a
Sulfur	0.24	0.04	0.15	0.57	n/a	n/a	n/a	n/a
Calcium	0.03	0.27	0.01	0.09	n/a	n/a	n/a	n/a
Vanadium	0.05	0.08	0.06	0.27	0.02	0.14	0.02	0.25
Chromium	0.10	0.14	0.24	0.03	n/a	n/a	n/a	n/a
Manganese	0.01	0.77	0.23	0.00	0.00	0.01	0.05	0.65
Iron	0.00	0.07	0.06	0.57	0.02	0.00	0.01	0.37
Nickel	0.00	0.06	0.01	0.01	n/a	n/a	n/a	n/a
Copper	0.00	0.01	0.10	0.75	0.00	0.04	0.01	0.59
Zinc	n/a	n/a	n/a	n/a	0.01	0.00	0.03	0.68
Cobalt	n/a	n/a	n/a	n/a	0.12	0.05	0.30	0.39