

Supplementary Materials

Table S1. Operating parameters for determination of Pb, Cd, Cr and Mn by GFAAS in PM2.5.

	Pb ($\lambda=283.3$ nm)			Cd ($\lambda=228.8$ nm)			Cr ($\lambda=357.9$ nm)			Mn ($\lambda=279.5$ nm)		
	Pyrolysis ^a	Atomization	Cleaning	Pyrolysis ^a	Atomization	Cleaning	Pyrolysis ^a	Atomization	Cleaning	Pyrolysis ^a	Atomization	Cleaning
Temperature (°C)	500	1500	2300	300	900	2100	1000	2200	2500	850	1700	2300
Ramp time (s)	1.5	0.7	1.6	0.7	0.4	2.4	3.5	1	0.6	2.9	0.6	1.2
Hold time (s)	25	4	4	25	3	4	25	3	4	25	3	4
Gas flow (L min ⁻¹)	2			2			2			2		
Lamp current (mA)	4.0			2.0			4.0			5.0		

^a Drying step was in the rang 90-120°C in 30 s

Table S2. Relative exposure factors used in calculating the chronic daily (CDI) intake of the PM2.5 contaminant.

	Weight(kg) ^a	Outdoors		Indoors at home		Indoors 80%(19.2hours) Outdoors 20%(4.8hours)	
		Deposition(%) ^a	Respiration rate (m ³ /hour) ^a	Deposition(%) ^a	Respiration rate (m ³ /hour) ^a	Deposition(%) ^b	Inhalation rate (m ³ /day) ^c
Adult male	60	70.90	1.200	70.92	0.778	70.916	20.6976
Adult female	51	70.58	0.994	72.92	0.687	72.452	17.9616
Boy 15 years	48	70.43	1.115	70.44	0.707	70.438	18.9264
Girl 15 years	48	70.89	1.002	71.08	0.633	71.042	16.9632
Child 10 years	28	73.91	0.859	74.30	0.555	74.222	14.7792
Child 5 years	17	78.10	0.487	73.85	0.321	74.700	8.5008

^a from ICRP (International Commission on Radiological Protection), 1994. Human respiratory tract model for radiological protection, ICRP publication 66: Annals of the ICRP. 24 (1-3).

^b calculated according to Eq: $E=0.2 \times A+0.8 \times B$

E—Deposition [Indoors 80% (19.2hours), Outdoors 20% (4.8hours)], %

A—Deposition (Outdoors), %

B—Deposition (Indoors), %

^c calculated according to Eq: $IR=4.8 \times C+19.2 \times D$

IR—Inhalation rate [Indoors 80% (19.2hours), Outdoors 20% (4.8hours)], m³/day

C—Respiration rate (Outdoors), m³/hour

E—Respiration rate (Indoors), m³/hour

Table S3. Health risk assessment of trace metals in PM2.5 for male adults and children (5years) in Guiyu and the reference area.

Metal	Male Adults					Children(5years)				
	CDI ^a	RfD ^a	HQ	SF ^b	ELCR	CDI ^a	RfD ^a	HQ	SF ^b	ELCR
(A). Guiyu										
Non-carcinogenic metals										
Pb	4.0×10^{-5}	3.5×10^{-3}	1.1×10^{-2}			6.1×10^{-5}	3.5×10^{-3}	1.7×10^{-2}		
Cr	1.1×10^{-6}	2.9×10^{-5}	3.8×10^{-2}			1.7×10^{-6}	2.9×10^{-5}	5.9×10^{-2}		
Mn	4.1×10^{-6}	1.4×10^{-5}	2.9×10^{-1}			6.3×10^{-6}	1.4×10^{-5}	4.5×10^{-1}		
Carcinogenic metals										
Cr	1.1×10^{-6}			42	4.6×10^{-5}	1.7×10^{-6}			42	7.1×10^{-5}
Cd	1.4×10^{-6}			6.3	8.8×10^{-6}	2.1×10^{-6}			6.3	1.3×10^{-5}
			$\Sigma=3.4 \times 10^{-1}$		$\Sigma=5.5 \times 10^{-5}$			$\Sigma=5.3 \times 10^{-1}$		$\Sigma=8.4 \times 10^{-5}$
(B). Reference										
Non-carcinogenic metals										
Pb	1.7×10^{-5}	3.5×10^{-3}	4.8×10^{-3}			2.6×10^{-5}	3.5×10^{-3}	7.4×10^{-3}		
Cr	9.3×10^{-7}	2.9×10^{-5}	3.2×10^{-2}			1.4×10^{-6}	2.9×10^{-5}	4.8×10^{-2}		
Mn	3.8×10^{-6}	1.4×10^{-5}	2.7×10^{-1}			5.8×10^{-6}	1.4×10^{-5}	4.1×10^{-1}		
Carcinogenic metals										
Cr	9.3×10^{-7}			42	3.9×10^{-5}	1.4×10^{-6}			42	5.9×10^{-5}
Cd	8.3×10^{-7}			6.3	5.2×10^{-6}	1.3×10^{-6}			6.3	8.2×10^{-6}
			$\Sigma=3.1 \times 10^{-1}$		$\Sigma=4.4 \times 10^{-5}$			$\Sigma=4.6 \times 10^{-1}$		$\Sigma=6.7 \times 10^{-5}$

^a mg kg⁻¹ day⁻¹

^b mg⁻¹ kg day

Table S4. Health risk assessment of trace metals in PM2.5 for boys (15years) and girls (15years) in Guiyu and the reference area.

Metal	Boys(15years)					Girls(15years)				
	CDI ^a	RfD ^a	HQ	SF ^b	ELCR	CDI ^a	RfD ^a	HQ	SF ^b	ELCR
(A). Guiyu										
Non-carcinogenic metals										
Pb	4.6×10 ⁻⁵	3.5×10 ⁻³	1.3×10 ⁻²			4.1×10 ⁻⁵	3.5×10 ⁻³	1.2×10 ⁻²		
Cr	1.2×10 ⁻⁶	2.9×10 ⁻⁵	4.1×10 ⁻²			1.1×10 ⁻⁶	2.9×10 ⁻⁵	3.8×10 ⁻²		
Mn	4.7×10 ⁻⁶	1.4×10 ⁻⁵	3.4×10 ⁻¹			4.2×10 ⁻⁶	1.4×10 ⁻⁵	3.0×10 ⁻¹		
Carcinogenic metals										
Cr	1.2×10 ⁻⁶			42	5.0×10 ⁻⁵	1.1×10 ⁻⁶			42	4.6×10 ⁻⁵
Cd	1.6×10 ⁻⁶			6.3	1.0×10 ⁻⁵	1.4×10 ⁻⁶			6.3	8.8×10 ⁻⁶
			Σ=3.9×10 ⁻¹		Σ=6.0×10 ⁻⁵			Σ=3.5×10 ⁻¹		Σ=5.5×10 ⁻⁵
(B). Reference										
Non-carcinogenic metals										
Pb	1.9×10 ⁻⁵	3.5×10 ⁻³	5.4×10 ⁻³			1.7×10 ⁻⁵	3.5×10 ⁻³	4.8×10 ⁻³		
Cr	1.1×10 ⁻⁶	2.9×10 ⁻⁵	3.8×10 ⁻²			9.6×10 ⁻⁷	2.9×10 ⁻⁵	3.3×10 ⁻²		
Mn	4.3×10 ⁻⁶	1.4×10 ⁻⁵	3.1×10 ⁻¹			3.9×10 ⁻⁶	1.4×10 ⁻⁵	2.8×10 ⁻¹		
Carcinogenic metals										
Cr	1.1×10 ⁻⁶			42	4.6×10 ⁻⁵	9.6×10 ⁻⁷			42	4.0×10 ⁻⁵
Cd	9.4×10 ⁻⁷			6.3	5.9×10 ⁻⁶	8.5×10 ⁻⁷			6.3	5.4×10 ⁻⁶
			Σ=3.5×10 ⁻¹		Σ=5.2×10 ⁻⁵			Σ=3.2×10 ⁻¹		Σ=4.5×10 ⁻⁵

^a mg kg⁻¹day⁻¹

^b mg⁻¹kg day