

Supplementary Materials

Toxic metals in particulate matter and health risks in an e-waste dismantling park and its surrounding areas: Analysis of three PM size groups

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There are 13 pages including 5 figures and 7 tables.

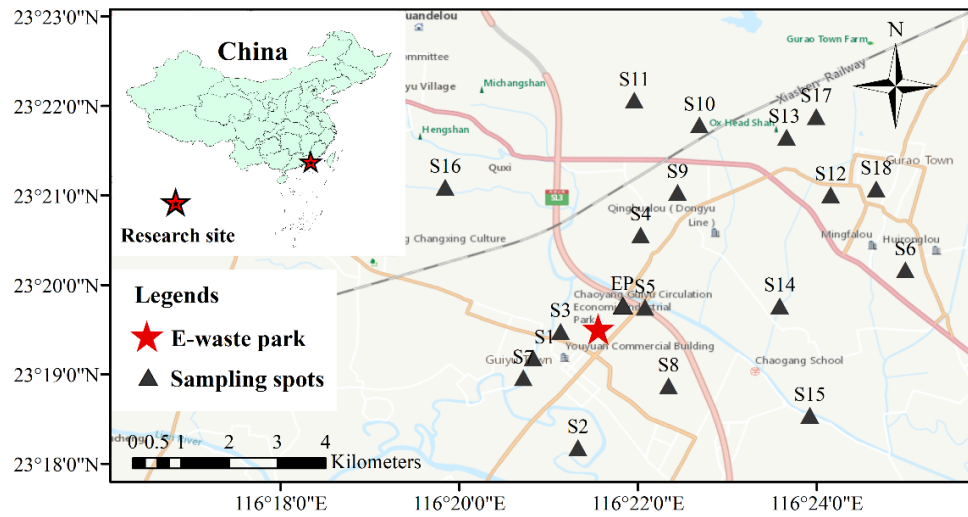


Figure S1. Research site and sampling spots in e-waste area

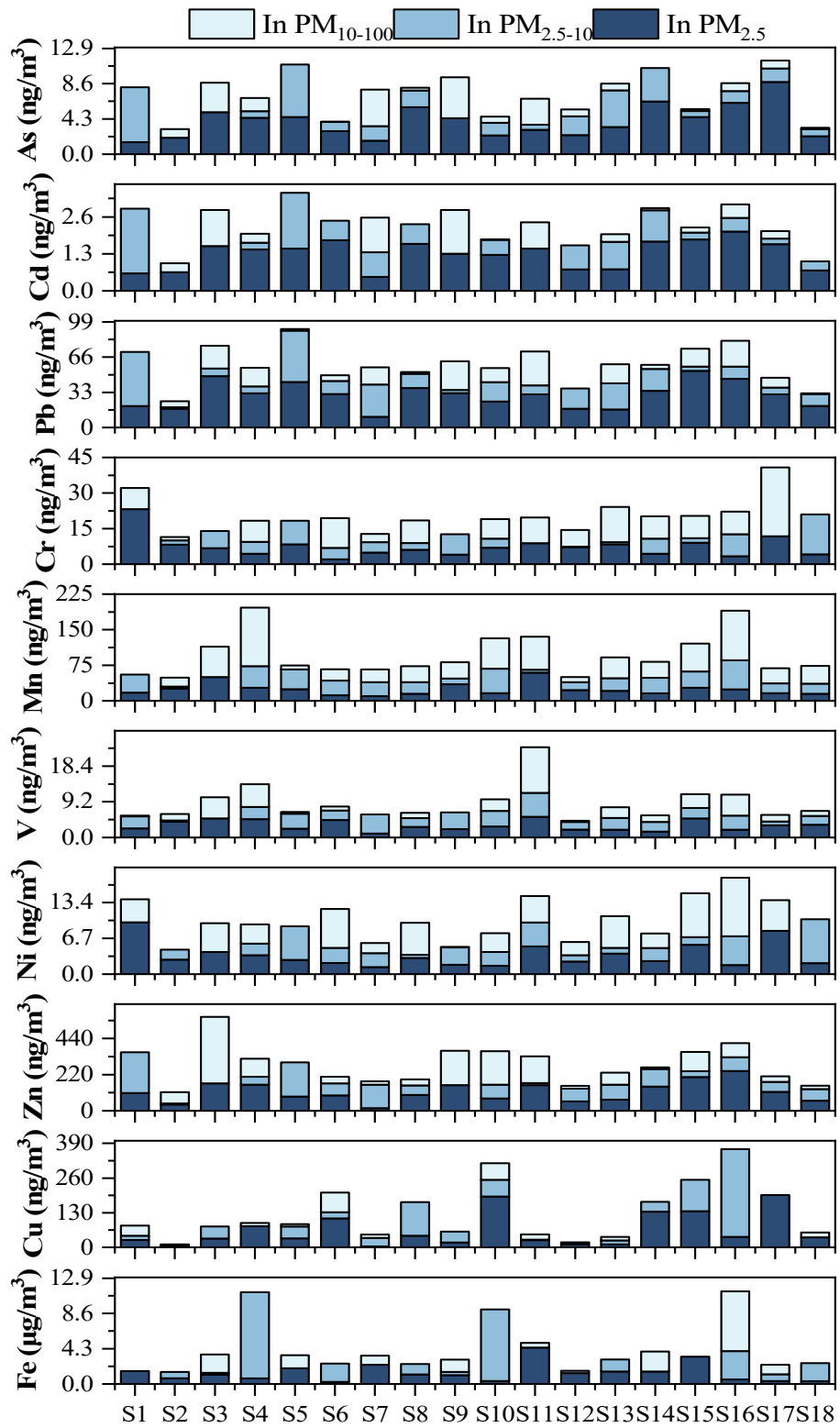


Figure S2. Metal concentration in each site of the e-waste surrounding residential area

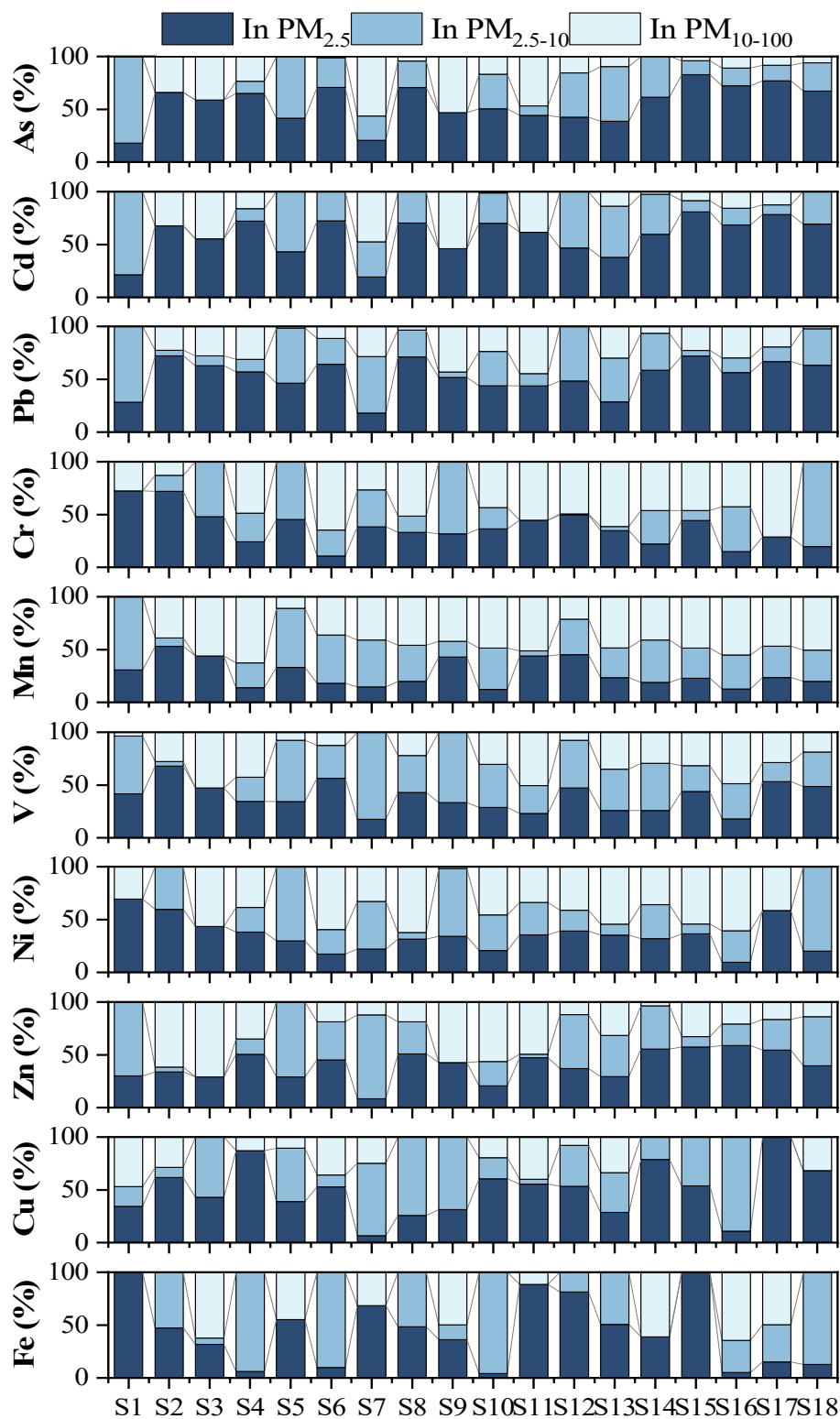


Figure S3. Size distribution of metals in each site in the residential areas of e-waste area

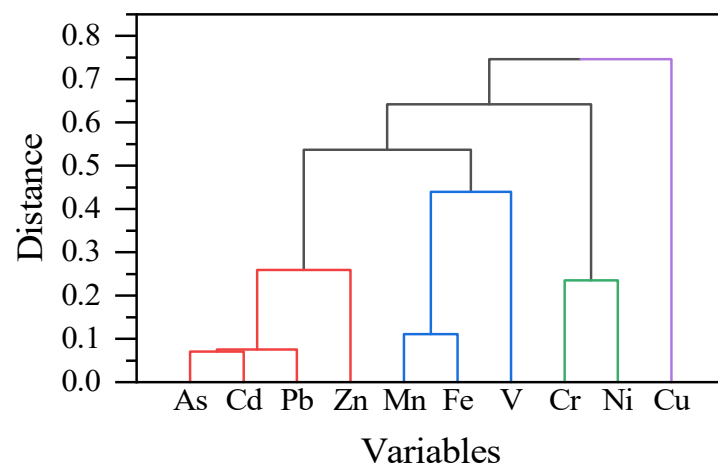
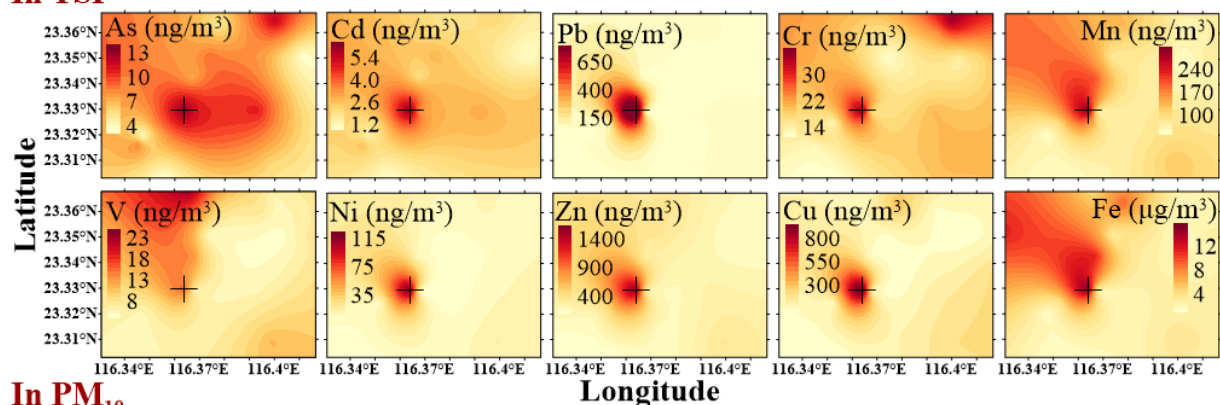
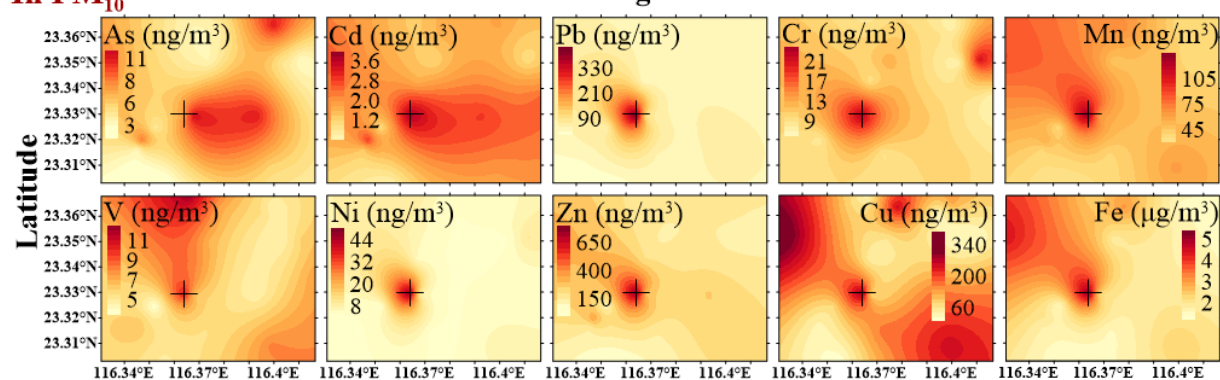


Figure S4. The cluster analysis of metals in the surrounding residential area; the same color represents the primary cluster

In TSP



In PM₁₀



In PM_{2.5}

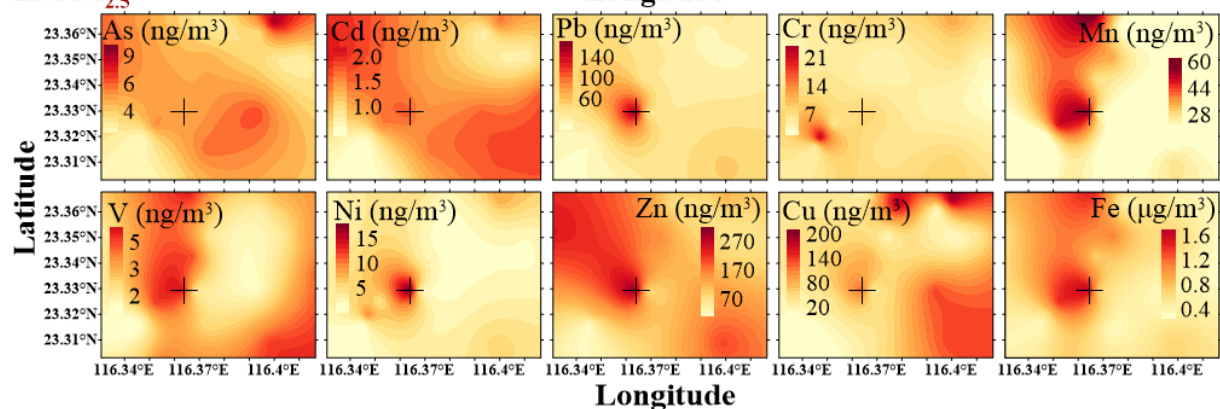


Figure S5. Spatial distribution of metal in TSP, PM₁₀ and PM_{2.5} in e-waste dismantling park (the location of cross) and surrounding residential areas; wind direction is mainly northeast.

Table S1. The longitude and latitude of sampling spots

Sampling date	Sampling spot	Longitude (N)	Latitude (E)	Temperature (°C)	Weather
2017.11.2	EP	116°21'06"	23°19'02"	34.4	Sunny
2017.11.2	S1	116°22'06"	23°19'38"		
2017.11.3	S2	116°21'36"	23°18'02"	34.9	Sunny
2017.11.3	S3	116°21'24"	23°19'20"		
2017.11.4	S4	116°22'18"	23°20'25"	32.5	Cloudy with scattered light rain
2017.11.4	S5	116°22'22"	23°19'27"		
2017.11.5	S6	116°25'16"	23°20'01"	32.8	Sunny
2017.11.5	S7	116°20'59"	23°18'49"		
2017.11.6	S8	116°22'37"	23°18'44"	32.2	Cloudy
2017.11.6	S9	116°22'43"	23°20'53"		
2017.11.7	S10	116°22'58"	23°21'39"	32.4	Cloudy to light rain
2017.11.7	S11	116°22'14"	23°21'55"		
2017.11.8	S12	116°24'26"	23°20'52"	33.6	Cloudy to sunny
2017.11.8	S13	116°23'56"	23°21'30"		
2017.11.9	S14	116°23'52"	23°19'37"	32.7	Sunny
2017.11.9	S15	116°24'12"	23°18'24"		
2017.11.10	S16	116°20'07"	23°20'57"	36.0	Sunny
2017.11.10	S17	116°24'17"	23°21'44"		
2017.11.11	S18	116°24'56"	23°20'56"	31.0	Cloudy

Table S2. Digestion program of microwave-assisted acid digestion method

Procedure	Climbing time/min	Duration /min	Temperature / °C	Power/ W
1	15:00	5:00	170	1600
2	08:00	8:00	180	1600
3	08:00	15:00	200	1600
Total		56:00		

Table S3. The selected metals IUR and RfC values for health risk assessment

	As	Cr	Ni	Cd	V	Mn	Pb
IUR (mg/m ³)	4.3E-03	8.40E-02	2.6E-04	1.8E-03	-	-	8.0E-05
RfC (ug/m ³) ⁻¹	1.5E-05	1.00E-04	9.0E-05	1.0E-05	1.0E-04	5.0E-05	-

Obtained from: <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>

Table S4. The Shapiro-Wilk normality test of metals concentration in size fraction in the surrounding residential area in e-waste area

		DF	Statistic	p-value	Decision at level (5%)
As	PM _{2.5}	18	0.92887	0.18553	Can't reject normality
	PM _{2.5-10}	18	0.88691	0.03418	Reject normality
	PM ₁₀₋₁₀₀	18	0.87081	0.01835	Reject normality
Cd	PM _{2.5}	18	0.904	0.06749	Can't reject normality
	PM _{2.5-10}	18	0.93149	0.20624	Can't reject normality
	PM ₁₀₋₁₀₀	18	0.88539	0.0322	Reject normality
Pb	PM _{2.5}	18	0.96126	0.62614	Can't reject normality
	PM _{2.5-10}	18	0.83408	0.0048	Reject normality
	PM ₁₀₋₁₀₀	18	0.92663	0.16939	Can't reject normality
Cr	PM _{2.5}	18	0.75589	3.86E-04	Reject normality
	PM _{2.5-10}	18	0.92648	0.16831	Can't reject normality
	PM ₁₀₋₁₀₀	18	0.88222	0.02846	Reject normality
Mn	PM _{2.5}	18	0.82779	0.00386	Reject normality
	PM _{2.5-10}	18	0.99212	0.99978	Can't reject normality
	PM ₁₀₋₁₀₀	18	0.92946	0.18997	Can't reject normality
V	PM _{2.5}	18	0.92499	0.15845	Can't reject normality
	PM _{2.5-10}	18	0.9534	0.48079	Can't reject normality
	PM ₁₀₋₁₀₀	18	0.84913	0.00821	Reject normality
Ni	PM _{2.5}	18	0.81595	0.00257	Reject normality
	PM _{2.5-10}	18	0.94031	0.2934	Can't reject normality
	PM ₁₀₋₁₀₀	18	0.97651	0.90711	Can't reject normality
Zn	PM _{2.5}	18	0.97013	0.80014	Can't reject normality
	PM _{2.5-10}	18	0.94091	0.30035	Can't reject normality
	PM ₁₀₋₁₀₀	18	0.89624	0.04944	Reject normality
Cu	PM _{2.5}	18	0.81561	0.00255	Reject normality
	PM _{2.5-10}	18	0.76532	5.12E-04	Reject normality
	PM ₁₀₋₁₀₀	18	0.76956	5.82E-04	Reject normality
Fe	PM _{2.5}	18	0.83224	0.0045	Reject normality
	PM _{2.5-10}	18	0.88584	0.03277	Reject normality
	PM ₁₀₋₁₀₀	18	0.71373	1.16E-04	Reject normality

Table S5. The recovery of metals in the blank quartz fiber filters with spiked 50 µg/L metals

Element	1#	2#	3#	Average	Standard	Average recovery
				concentrations	deviation	
Unit				µg/L		%
V	45.22	43.10	42.39	43.57	1.47	87.14
Cr	44.32	42.34	39.38	42.01	2.49	84.02
Mn	42.93	42.12	38.67	41.24	2.26	82.47
Ni	45.99	43.21	41.90	43.70	2.09	87.39
Cu	45.35	42.54	41.47	43.12	2.00	86.24
Zn	42.42	44.77	35.17	40.78	5.00	81.57
As	47.03	46.25	46.10	46.46	0.50	92.91
Cd	48.73	47.67	47.66	48.02	0.61	96.04
Pb	46.15	45.17	45.17	45.49	0.57	90.99

Table S6. The Spearman correlation of metals in e-waste dismantling park

	As	Cd	Pb	Cr	Mn	V	Ni	Zn	Cu
Cd	0.500								
Pb	0.500	1.000**							
Cr	-0.500	0.500	0.500						
Mn	0.500	1.000**	1.000**	0.500					
V	1.000**	0.500	0.500	-0.500	0.500				
Ni	0.500	1.000**	1.000**	0.500	1.000**	0.500			
Zn	0.500	1.000**	1.000**	0.500	1.000**	0.500	1.000**		
Cu	0.500	1.000**	1.000**	0.500	1.000**	0.500	1.000**	1.000**	
Fe	0.500	1.000**	1.000**	0.500	1.000**	0.500	1.000**	1.000**	1.000**

** : The correlation is significant at the 0.01 level (two-tailed);

Table S7. The Spearman correlation coefficients of metals in the residential area surrounding the e-waste dismantling park

	As	Cd	Pb	Cr	Mn	V	Ni	Zn	Cu
Cd	0.917**								
Pb	0.674**	0.668**							
Cr	-0.184	-0.164	-0.046						
Mn	-0.181	-0.286*	0.211	0.256					
V	0.048	0.057	0.392**	0.054	0.416**				
Ni	-0.188	-0.082	-0.008	0.860**	0.288*	0.239			
Zn	0.595**	0.589**	0.725**	0.089	0.363**	0.405**	0.206		
Cu	0.202	0.201	0.314*	0.137	0.169	0.223	0.145	0.362*	
Fe	-0.226	-0.265	-0.015	0.265	0.448**	0.129	0.264	0.010	-0.044

** : The correlation is significant at the 0.01 level (two-tailed);

* : The correlation is significant at the 0.05 level (two-tailed).