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Table S14. Concentrations of trace (μg/g) and major (%) elements in the fine fly ashes from the Damo Power Plant.

Table S15. Concentrations of trace (μg/g) and major (%) elements in the coarse fly ashes

from the Damo Power Plant.

Table S16. Concentrations of trace (μg/g) and major (%) elements in the bottom ashes from the Damo Power Plant.

Table S1. Samples collected for the present study.

	Sample No.	Sample Type	Sample No.	Sample Type	Sample No.	Sample Type	Sample No.	Sample Type
Xilaifeng Power Plant	x-rc-1	Feed coal	x-fa1-5	Fly ash	x-fa2-9	Fly ash	x-ba1-13	Bottom ash
	x-rc-2	Feed coal	x-fa1-6	Fly ash	x-fa2-10	Fly ash	x-ba1-14	Bottom ash
	x-rc-3	Feed coal	x-fa1-7	Fly ash	x-fa2-11	Fly ash	x-ba2-1	Bottom ash
	x-rc-4	Feed coal	x-fa1-8	Fly ash	x-fa2-12	Fly ash	x-ba2-2	Bottom ash
	x-rc-5	Feed coal	x-fa1-9	Fly ash	x-fa2-13	Fly ash	x-ba2-3	Bottom ash
	x-rc-6	Feed coal	x-fa1-10	Fly ash	x-fa2-14	Fly ash	x-ba2-4	Bottom ash
	x-rc-7	Feed coal	x-fa1-11	Fly ash	x-ba1-1	Bottom ash	x-ba2-5	Bottom ash
	x-rc-8	Feed coal	x-fa1-12	Fly ash	x-ba1-2	Bottom ash	x-ba2-6	Bottom ash
	x-rc-9	Feed coal	x-fa1-13	Fly ash	x-ba1-3	Bottom ash	x-ba2-7	Bottom ash
	x-rc-10	Feed coal	x-fa1-14	Fly ash	x-ba1-4	Bottom ash	x-ba2-8	Bottom ash
	x-rc-11	Feed coal	x-fa2-1	Fly ash	x-ba1-5	Bottom ash	x-ba2-9	Bottom ash
	x-rc-12	Feed coal	x-fa2-2	Fly ash	x-ba1-6	Bottom ash	x-ba2-10	Bottom ash
	x-rc-13	Feed coal	x-fa2-3	Fly ash	x-ba1-7	Bottom ash	x-ba2-11	Bottom ash
	x-rc-14	Feed coal	x-fa2-4	Fly ash	x-ba1-8	Bottom ash	x-ba2-12	Bottom ash
	x-fa1-1	Fly ash	x-fa2-5	Fly ash	x-ba1-9	Bottom ash	x-ba2-13	Bottom ash
	x-fa1-2	Fly ash	x-fa2-6	Fly ash	x-ba1-10	Bottom ash	x-ba2-14	Bottom ash
	x-fa1-3	Fly ash	x-fa2-7	Fly ash	x-ba1-11	Bottom ash		
	x-fa1-4	Fly ash	x-fa2-8	Fly ash	x-ba1-12	Bottom ash		
	Sample No.	**Sample Type**	**Sample No.**	**Sample Type**	**Sample No.**	**Sample Type**	**Sample No.**	**Sample Type**
Damo Power Plant	d-rc-1	Feed coal	d-fa(c)-6	Coarse fly ash	d-fa(f)-6	Fine fly ash	d-ba-5	Bottom ash
	d-rc-2	Feed coal	d-fa(c)-7	Coarse fly ash	d-fa(f)-7	Fine fly ash	d-ba-6	Bottom ash
	d-rc-3	Feed coal	d-fa(c)-8	Coarse fly ash	d-fa(f)-8	Fine fly ash	d-ba-7	Bottom ash
	d-rc-4	Feed coal	d-fa(c)-9	Coarse fly ash	d-fa(f)-9	Fine fly ash	d-ba-8	Bottom ash
	d-rc-5	Feed coal	d-fa(c)-10	Coarse fly ash	d-fa(f)-10	Fine fly ash	d-ba-9	Bottom ash
	d-rc-6	Feed coal	d-fa(c)-11	Coarse fly ash	d-fa(f)-11	Fine fly ash	d-ba-10	Bottom ash
	d-rc-7	Feed coal	d-fa(c)-12	Coarse fly ash	d-fa(f)-12	Fine fly ash	d-ba-11	Bottom ash
	d-fa(c)-2	Coarse fly ash	d-fa(f)-2	Fine fly ash	d-ba-1	Bottom ash	d-ba-12	Bottom ash
	d-fa(c)-3	Coarse fly ash	d-fa(f)-3	Fine fly ash	d-ba-2	Bottom ash		
	d-fa(c)-4	Coarse fly ash	d-fa(f)-4	Fine fly ash	d-ba-3	Bottom ash		
	d-fa(c)-5	Coarse fly ash	d-fa(f)-5	Fine fly ash	d-ba-4	Bottom ash		

Note: x-fa1, fly ash from Generator No. 1 of Xilaifeng; x-fa2, fly ash from Generator No. 2 of Xilaifeng; x-ba1; bottom ash from Generator No. 1 of Xilaifeng; x-ba2; bottom ash from Generator No. 2 of Xilaifeng.

Table S2. Proximate analysis (%) and total sulfur (%) of feed coals from the Xilaifeng and Damo Power Plants.

	Sample No.	M_{ad} (%)	A_d (%)	V_{daf} (%)	$S_{t,d}$ (%)
Xilaifeng Power Plant	x-rc-1	0.60	42.47	35.54	1.86
	x-rc-2	1.94	44.47	36.21	1.69
	x-rc-3	1.10	53.39	39.12	3.28
	x-rc-4	1.11	59.88	42.97	2.89
	x-rc-5	1.00	46.18	35.33	1.67
	x-rc-6	1.42	52.05	39.49	1.44
	x-rc-7	1.10	46.75	37.21	2.12
	x-rc-8	0.75	57.48	42.04	2.15
	x-rc-9	0.90	63.44	45.4	2.45
	x-rc-10	0.75	43.68	34.99	2.67

	x-rc-11	1.25	54.28	41.16	2.76
	x-rc-12	1.05	56.08	41.53	2.70
	x-rc-13	1.01	64.25	48.29	0.96
	x-rc-14	1.06	56.67	42.24	2.45
	Average	1.07	52.93	40.11	2.22
Damo Power Plant	Sample No.	M_{ad} (%)	A_d (%)	V_{daf} (%)	$S_{t,d}$ (%)
	d-rc-1	1.07	52.74	38.75	2.50
	d-rc-2	1.17	42.45	34.17	4.16
	d-rc-3	0.95	42.46	33.82	3.21
	d-rc-4	1.00	46.86	36.27	2.53
	d-rc-5	1.08	55.97	39.23	3.40
	d-rc-6	1.02	47.77	35.74	3.45
	d-rc-7	1.22	50.24	37.64	3.99
	Average	1.07	48.36	36.52	3.32

M, moisture; A, ash yield; V, volatile matter; S_t, total sulfur; ad, air-dry basis; d, dry basis; daf, dry and ash-free basis.

Table S3. Mineralogical compositions of the low temperature ashes (LTAs) of feed coals (wt. %) for the Xilaifeng Power Plant by XRD and Siroquant analysis.

Sample No.	Kaolinite	Quartz	Illite	Boehmite	Quartz	Pyrite	Anatase	Dolomite	Calcite
x-rc-1	89.0	2.3	4.9	1.8	bdl	bdl	bdl	2.0	bdl
x-rc-2	77.6	7.7	5.5	2.2	4.3	2.4	0.3	bdl	bdl
x-rc-3	66.0	6.5	18.2	3.0	1.7	3.9	0.7	bdl	bdl
x-rc-4	60.3	20.8	7.7	2.7	1.8	5.6	1.1	bdl	bdl
x-rc-5	61.4	16.4	15.4	bdl	2.0	4.8	bdl	bdl	bdl
x-rc-6	74.3	13.9	1.9	bdl	2.5	6.8	0.6	bdl	bdl
x-rc-7	72.6	9.9	8.2	2.1	1.5	5.7	bdl	bdl	bdl
x-rc-8	66.2	10.1	12.3	3.4	1.5	6.5	bdl	bdl	bdl
x-rc-9	68.3	7.8	10.0	3.2	7.9	2.8	bdl	bdl	bdl
x-rc-10	79.3	6.7	5.3	1.4	3.4	3.4	0.1	bdl	0.4
x-rc-11	71.1	8.9	7.7	4.6	4.7	2.7	0.3	bdl	bdl
x-rc-12	71.1	8.0	10.8	1.5	4.3	4.3	bdl	bdl	bdl
x-rc-13	78.4	2.3	13.2	2.0	bdl	2.6	1.5	bdl	bdl
x-rc-14	83.0	5.2	3.2	3.0	2.0	3.6	bdl	bdl	bdl
Average	72.8	9.0	8.9	2.2	2.7	3.9	0.3	0.1	< 0.1

bdl, below detection limit.

Table S4. Mineralogical compositions of the low temperature ashes (LTAs) of feed coals (wt. %) for the Damo Power Plant by XRD and Siroquant analysis.

Sample	Kaolinite	Quartz	Illite	Pyrite	Gypsum	Anhydrite	Anatase	Diaspore
d-rc-1	77.3	10.0	6.7	6.0	bdl	bdl	bdl	bdl
d-rc-2	63.4	11.1	12.8	12.0	bdl	0.7	bdl	bdl
d-rc-3	73.5	13.9	3.8	5.9	2.9	bdl	bdl	bdl
d-rc-4	70.4	12.2	9.3	4.9	3.2	bdl	bdl	bdl
d-rc-5	63.6	17.2	12.2	7.0	bdl	bdl	bdl	bdl
d-rc-6	72.3	13.1	5.7	8.9	bdl	bdl	bdl	bdl
d-rc-7	64.7	12.2	9.1	6.1	7.2	bdl	0.5	0.2
Average	69.3	12.8	8.5	7.3	1.9	0.1	< 0.1	< 0.1

bdl, below detection limit.

Table S5. Concentrations of trace (μg/g) and major (%) elements in the feed coals from the Xilaifeng Power Plant.

Element	x-rc-1	x-rc-2	x-rc-3	x-rc-4	x-rc-5	x-rc-6	x-rc-7	x-rc-8	x-rc-9	x-rc-10	x-rc-11	x-rc-12	x-rc-13	x-rc-14	Average
Li	208.45	161.71	185.82	160.06	184.31	187.06	153.09	199.76	197.45	179.51	189.36	154.52	304.51	200.27	190.42
Be	2.50	3.29	2.89	3.13	2.90	3.43	3.28	3.16	3.48	2.53	3.08	3.14	3.05	3.36	3.09
F	206	229	277	319	267	272	283	243	327	229	275	328	237	285	270
Sc	7.71	8.78	8.40	9.45	9.05	9.72	9.16	8.79	6.50	8.65	9.12	11.01	2.13	8.35	8.34
V	29.81	43.45	39.25	61.81	45.89	42.19	48.24	48.02	54.66	38.57	52.47	53.11	44.04	54.17	46.83
Cr	11.29	21.82	16.94	31.94	22.00	18.22	22.59	22.17	26.47	17.35	23.87	24.78	19.67	25.17	21.73
Co	10.73	4.83	8.08	7.61	5.41	4.67	6.46	5.36	6.47	3.36	7.18	7.97	4.78	6.57	6.39
Ni	33.91	14.35	21.59	15.78	12.95	12.76	15.09	13.18	17.73	8.50	19.03	18.10	11.49	19.86	16.74
Cu	14.56	17.84	17.18	20.62	17.67	18.53	19.03	18.45	20.27	20.23	19.74	21.02	17.79	19.21	18.73
Zn	21.25	36.47	24.46	37.81	30.36	32.92	39.08	40.88	42.60	51.07	34.77	42.10	28.40	44.90	36.22
Ga	19.62	23.35	24.76	26.13	22.41	27.09	22.99	27.14	29.67	19.10	25.89	26.81	29.09	27.49	25.11
Ge	0.63	1.46	1.32	1.82	1.54	1.55	1.81	1.44	1.99	1.09	2.02	1.32	1.61	1.88	1.54
As	3.75	6.42	9.58	10.24	4.95	4.86	6.38	7.30	8.74	4.71	5.88	4.73	4.69	10.37	6.61
Se	3.66	3.35	5.06	4.17	2.56	4.40	3.37	4.97	4.66	3.36	4.29	4.66	3.87	4.55	4.07
Rb	8.39	15.41	14.75	25.17	18.16	14.70	20.18	16.87	14.22	13.58	18.37	27.15	11.26	12.75	16.50
Sr	240.20	207.78	314.57	123.30	194.19	176.15	200.12	144.03	69.46	228.36	177.83	187.94	39.54	132.34	173.99
Y	20.90	20.98	21.20	23.69	23.21	24.44	24.62	22.94	25.35	22.86	24.62	29.44	22.85	22.03	23.51
Zr	211.56	244.81	225.00	280.56	260.29	274.85	245.94	288.42	290.63	210.32	275.28	273.09	332.83	305.27	265.63
Nb	14.18	17.06	19.99	20.46	17.98	21.63	16.63	21.25	23.72	14.74	19.97	21.19	25.84	21.69	19.74
Mo	2.68	4.40	4.67	5.92	3.65	3.74	4.23	4.10	4.42	3.89	4.31	4.99	2.76	6.17	4.28
Cd	0.32	0.42	0.39	0.48	0.43	0.42	0.42	0.47	0.49	0.35	0.48	0.45	0.49	0.58	0.44
In	0.08	0.08	0.09	0.10	0.09	0.10	0.09	0.10	0.11	0.09	0.10	0.11	0.12	0.12	0.10
Sn	2.75	3.10	3.37	3.63	3.38	3.69	3.25	3.79	4.16	3.18	3.74	3.97	4.50	3.99	3.61
Sb	0.54	0.51	0.57	0.50	0.54	0.50	0.61	0.58	0.58	0.58	0.59	0.53	0.38	0.72	0.55
Cs	0.81	1.36	1.44	2.95	1.58	1.43	1.82	1.73	2.20	1.23	2.00	2.51	1.00	1.48	1.68
Ba	118.80	144.10	140.64	124.86	126.47	107.01	147.62	112.87	85.36	127.31	127.16	125.09	42.30	96.65	116.16
La	27.03	32.45	39.63	32.51	33.49	35.96	35.64	29.51	35.43	35.58	41.00	42.15	28.93	27.41	34.05
Ce	55.66	77.83	81.49	78.79	71.80	79.43	75.08	72.71	75.01	74.49	87.26	94.34	68.84	60.91	75.26
Pr	5.77	7.21	7.99	7.46	7.29	7.85	7.80	7.00	7.87	7.77	8.74	9.77	6.92	6.47	7.56
Nd	21.72	27.46	29.68	28.77	27.53	29.74	29.94	26.95	30.56	28.98	32.79	37.54	25.26	24.91	28.70
Sm	4.11	5.05	5.21	5.34	5.02	5.55	5.49	5.03	5.83	5.19	5.91	6.86	4.94	4.85	5.31
Eu	0.83	0.96	1.01	0.98	0.98	1.03	1.08	0.96	1.02	1.02	1.15	1.33	0.92	0.89	1.01
Gd	4.79	5.56	5.96	5.93	5.65	6.00	6.17	5.69	5.88	5.90	6.76	7.71	5.25	5.29	5.89
Tb	0.70	0.75	0.79	0.80	0.79	0.83	0.85	0.78	0.79	0.80	0.89	1.05	0.78	0.75	0.81
Dy	4.35	4.37	4.55	4.82	4.84	5.01	5.13	4.76	4.90	4.75	5.28	6.20	4.68	4.45	4.86
Ho	0.82	0.80	0.82	0.90	0.89	0.94	0.96	0.89	0.90	0.90	0.98	1.14	0.83	0.84	0.90
Er	2.49	2.40	2.47	2.78	2.75	2.80	2.89	2.70	2.81	2.72	2.97	3.46	2.51	2.54	2.73
Tm	0.33	0.32	0.33	0.38	0.36	0.39	0.39	0.37	0.37	0.38	0.42	0.49	0.34	0.35	0.37
Yb	2.39	2.27	2.36	2.77	2.67	2.71	2.84	2.70	2.60	2.66	2.96	3.36	2.34	2.56	2.65
Lu	0.33	0.31	0.32	0.38	0.37	0.37	0.39	0.37	0.37	0.38	0.42	0.48	0.31	0.36	0.37
Hf	5.65	6.40	6.11	7.38	6.75	7.32	6.40	7.70	8.03	5.68	7.34	7.57	10.07	8.33	7.19
Ta	1.01	0.99	1.36	1.38	1.20	1.43	1.16	1.44	1.59	1.02	1.42	1.44	1.74	1.23	1.31
Hg	0.36	0.27	0.43	0.40	0.25	0.23	0.33	0.34	0.27	0.38	0.35	0.31	0.33	0.28	0.32
Tl	0.10	0.39	0.67	0.75	0.30	0.30	0.38	0.41	0.53	0.17	0.39	0.41	0.48	0.45	0.41
Pb	25.42	27.76	29.19	29.34	29.86	29.05	30.42	29.18	30.04	27.30	30.22	32.49	23.76	32.58	29.04
Bi	0.78	0.60	0.72	0.74	0.75	0.78	0.72	0.79	0.72	0.84	0.77	0.80	0.70	0.79	0.75
Th	18.21	19.54	18.82	21.14	21.00	22.74	20.44	21.63	14.98	22.02	23.38	22.97	6.11	17.22	19.30
U	5.09	6.20	5.83	7.52	6.57	6.77	6.20	6.95	7.31	5.77	7.55	7.90	6.24	7.54	6.68
Na_2O	0.03	0.07	0.06	0.08	0.07	0.09	0.08	0.07	0.10	0.06	0.09	0.06	0.06	0.07	0.07
MgO	0.23	0.24	0.27	0.32	0.35	0.31	0.29	0.31	0.38	0.31	0.39	0.28	0.20	0.28	0.30

Al_2O_3	17.02	16.89	19.97	20.57	16.69	19.61	17.02	21.46	23.14	16.27	19.47	20.56	26.56	21.88	19.79
SiO_2	21.46	22.60	27.08	32.54	23.91	26.71	23.78	29.80	32.70	21.59	27.70	29.38	33.29	28.81	27.24
P_2O_5	0.09	0.15	0.14	0.10	0.11	0.12	0.13	0.09	0.10	0.10	0.12	0.09	0.14	0.09	0.11
K_2O	0.23	0.40	0.45	0.78	0.48	0.46	0.52	0.57	0.77	0.33	0.61	0.64	0.51	0.48	0.52
CaO	0.46	0.34	0.35	0.29	0.50	0.45	0.49	0.41	0.53	0.59	0.59	0.32	0.17	0.32	0.41
TiO_2	0.61	0.66	0.75	0.80	0.72	0.83	0.68	0.82	0.88	0.66	0.85	0.77	1.01	0.79	0.77
MnO	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Fe_2O_3	1.47	2.38	3.43	3.74	2.36	2.43	2.71	2.99	3.50	2.94	3.11	3.31	1.85	3.20	2.81
Ash yield	42.47	44.47	53.39	59.88	46.18	52.05	46.75	57.48	63.44	43.68	54.28	56.08	64.25	56.67	52.93

Table S6. Concentrations of trace (μg/g) and major (%) elements in the feed coals from the Damo Power Plant.

Element	d-rc-1	d-rc-2	d-rc-3	d-rc-4	d-rc-5	d-rc-6	d-rc-7	Average
Li	66.61	39.33	57.46	54.22	39.04	27.36	28.83	44.69
Be	2.60	2.48	2.46	2.63	2.73	2.68	2.58	2.59
F	305	259	246	304	557	696	335	386
Sc	3.30	2.65	3.39	2.24	2.17	1.93	1.19	2.41
V	47.03	58.26	44.83	62.22	72.57	64.46	50.00	57.05
Cr	20.64	24.58	20.93	26.81	34.53	27.85	21.68	25.29
Co	5.78	4.78	4.94	5.93	6.92	6.70	6.41	5.92
Ni	14.46	12.21	10.04	14.41	16.98	14.44	13.92	13.78
Cu	27.02	30.23	24.30	28.88	32.34	31.05	30.35	29.16
Zn	21.28	24.07	20.78	22.67	47.92	23.15	24.06	26.28
Ga	15.33	13.35	13.50	15.15	16.07	14.67	13.27	14.48
Ge	1.69	1.72	1.76	1.93	1.83	1.76	2.09	1.83
As	7.73	9.78	6.11	5.19	8.15	5.35	12.63	7.85
Se	3.11	4.51	2.50	2.82	4.83	3.69	4.81	3.75
Rb	25.58	25.19	23.12	25.29	40.71	37.62	25.45	28.99
Sr	49.83	72.88	52.53	46.38	70.81	106.84	71.81	67.30
Y	10.35	7.38	9.72	6.83	8.20	7.98	5.46	7.99
Zr	171.69	211.40	149.58	182.31	167.13	174.41	183.78	177.19
Nb	13.64	10.40	11.85	12.82	12.90	12.94	13.01	12.51
Mo	3.25	3.99	3.10	3.35	3.67	4.12	5.09	3.80
Cd	0.26	0.34	0.27	0.29	0.36	0.32	0.35	0.31
In	0.07	0.06	0.06	0.07	0.08	0.08	0.07	0.07
Sn	3.06	2.47	2.38	2.71	3.14	3.05	3.27	2.87
Sb	0.60	0.50	0.45	0.41	0.50	0.47	0.90	0.55
Cs	2.54	2.73	2.23	2.96	4.85	3.92	2.44	3.10
Ba	144.95	139.66	145.22	137.93	177.09	164.97	239.90	164.25
La	19.43	14.89	20.12	12.92	15.27	15.72	16.07	16.35
Ce	40.95	38.03	45.75	32.66	38.21	53.85	51.60	43.01
Pr	4.01	2.96	4.29	2.90	3.27	3.70	3.50	3.52
Nd	14.99	11.33	16.40	11.10	12.75	14.59	13.14	13.47
Sm	2.70	1.99	2.92	2.03	2.36	2.56	2.00	2.36
Eu	0.48	0.36	0.51	0.37	0.44	0.46	0.37	0.43
Gd	2.67	2.04	2.93	2.04	2.33	2.68	2.11	2.40
Tb	0.34	0.25	0.35	0.26	0.29	0.32	0.22	0.29
Dy	2.04	1.46	2.05	1.46	1.74	1.86	1.23	1.69
Ho	0.36	0.26	0.36	0.26	0.31	0.32	0.22	0.30
Er	1.14	0.81	1.06	0.80	0.96	1.04	0.63	0.92
Tm	0.15	0.11	0.14	0.11	0.12	0.14	0.08	0.12
Yb	1.12	0.81	1.03	0.77	0.87	0.97	0.57	0.88
Lu	0.15	0.11	0.14	0.10	0.12	0.13	0.08	0.12
Hf	4.91	5.13	4.18	4.84	4.60	4.78	5.02	4.78

Ta	1.10	0.92	0.98	1.06	1.05	1.05	1.15	1.05
Hg	0.74	0.81	0.42	0.37	0.46	0.39	1.05	0.61
Tl	1.04	1.74	0.89	0.76	1.10	0.91	1.50	1.14
Pb	34.74	28.11	24.44	24.74	28.27	27.27	39.72	29.61
Bi	0.86	0.79	0.66	0.80	0.91	0.99	0.89	0.84
Th	8.14	6.98	8.83	6.87	6.91	8.46	7.16	7.62
U	5.24	5.03	4.63	5.07	4.74	5.34	5.75	5.11
Na_2O	0.04	0.04	0.04	0.05	0.07	0.05	0.05	0.05
MgO	0.22	0.20	0.22	0.29	0.33	0.26	0.32	0.26
Al_2O_3	19.29	14.70	14.80	16.23	18.11	15.66	16.98	16.54
SiO_2	28.15	21.23	22.37	25.14	29.98	24.50	25.47	25.26
P_2O_5	0.10	0.06	0.06	0.07	0.31	0.50	0.09	0.17
K_2O	0.57	0.53	0.53	0.68	1.12	0.79	0.61	0.69
CaO	0.22	0.15	0.21	0.25	0.52	0.77	0.40	0.36
TiO_2	0.61	0.47	0.54	0.61	0.69	0.63	0.63	0.60
MnO	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01
Fe_2O_3	3.11	4.76	3.24	3.03	4.37	4.17	4.95	3.95
Ash yield (%)	52.74	42.45	42.46	46.86	55.97	47.77	50.24	48.36

Table S7. Mineralogical compositions of the fly ashes from the Xilaifeng Power Plant (%).

Sample No.	ROM (%)	Glass phase	Anhydrite	Hematite	Illite	Quartz	Calcite	Lime	Diaspore
x-fa1-1	6.07	67.7	9.4	10.2	5.7	4.1	1.7	1.2	bdl
x-fa1-2	7.23	68.2	12.6	8.1	2.6	4.6	1.3	2.6	bdl
x-fa1-3	6.78	55.5	18.9	6.5	3.9	5.3	4.9	5.0	bdl
x-fa1-4	6.98	64.2	15.5	5.6	1.5	4.1	3.9	5.2	bdl
x-fa1-5	8.47	53.6	18.4	6.5	5.8	5.5	5.1	5.1	bdl
x-fa1-6	8.65	52.4	19.1	6.5	6.0	5.2	6.0	4.8	bdl
x-fa1-7	8.86	53.1	17.1	6.8	7.5	6.3	5.4	3.8	bdl
x-fa1-8	9.28	51.8	18.7	6.7	6.8	6.0	6.7	3.3	bdl
x-fa1-9	8.39	42.4	22.9	12.0	8.9	7.0	4.2	2.6	bdl
x-fa1-10	8.58	57.1	16.6	7.9	9.5	4.7	1.9	2.3	bdl
x-fa1-11	8.44	63.3	13.1	8.4	7.6	4.9	1.6	1.1	bdl
x-fa1-12	8.62	60.6	16.2	7.7	6.0	5.1	2.1	2.3	bdl
x-fa1-13	6.36	71.0	8.7	8.3	2.7	6.0	1.6	1.7	bdl
x-fa1-14	3.95	78.0	4.5	6.7	6.8	4.0	bdl	bdl	bdl
x-fa2-1	6.88	69.2	8.7	9.5	5.2	5.5	1.2	0.7	bdl
x-fa2-2	5.84	78.1	3.2	9.0	4.5	4.7	0.5	bdl	bdl
x-fa2-3	7.63	62.6	13.0	6.4	5.1	4.9	4.9	3.1	bdl
x-fa2-4	8.49	49.5	18.7	7.0	9.2	4.4	6.4	4.8	bdl
x-fa2-5	8.40	53.5	18.2	5.8	8.0	4.9	5.0	4.6	bdl
x-fa2-6	4.69	75.1	2.6	9.7	4.0	8.6	bdl	bdl	bdl
x-fa2-7	5.53	78.0	2.8	8.7	4.8	5.7	bdl	bdl	bdl
x-fa2-8	5.04	74.6	2.8	9.9	6.4	6.3	bdl	bdl	bdl
x-fa2-9	7.07	61.1	13.6	8.1	8.9	5.7	1.4	1.2	bdl
x-fa2-10	5.30	76.2	2.8	10.2	3.2	6.7	bdl	bdl	0.9
x-fa2-11	4.92	76.7	2.9	9.3	6.0	5.1	bdl	bdl	bdl
x-fa2-12	8.57	59.2	16.4	7.6	8.3	5.1	2.0	1.4	bdl
x-fa2-13	5.75	65.7	12.3	7.1	4.2	5.0	2.5	3.2	bdl
x-fa2-14	7.26	65.1	10.2	8.1	8.2	4.2	3.1	1.1	bdl
Average	7.07	63.7	12.1	8.0	6.0	5.3	2.6	2.2	< 0.1

ROM, residual organic matter; bdl, below detection limit.

Table S8. Mineralogical compositions of the bottom ashes from the Xilaifeng Power Plant

(%).

Sample No.	ROM (%)	Glass phase	Quartz	Anhydrite	Illite	Hematite	Lime	Calcite	Rutile
x-ba1-1	1.96	71.7	12.5	8.9	3.5	2.6	0.8	bdl	bdl
x-ba1-2	2.77	73.7	11.1	7.7	4.7	2.1	0.7	bdl	bdl
x-ba1-3	1.70	68.9	11.8	9.4	7.2	2.1	0.6	bdl	bdl
x-ba1-4	4.16	73.4	12.0	6.1	5.8	2.0	0.7	bdl	bdl
x-ba1-5	2.69	71.2	12.1	8.1	4.8	3.2	0.6	bdl	bdl
x-ba1-6	1.22	61.6	14.1	11.3	8.9	3.2	0.9	bdl	bdl
x-ba1-7	1.54	75.3	10.9	8.9	1.2	2.7	0.5	bdl	0.5
x-ba1-8	2.06	75.4	12.4	5.3	3.0	2.1	0.7	bdl	1.1
x-ba1-9	2.95	69.1	14.4	7.2	6.2	2.7	0.4	bdl	bdl
x-ba1-10	3.03	69.0	10.4	12.0	4.0	2.9	0.7	bdl	1.0
x-ba1-11	2.55	67.9	13.4	6.1	10.0	2.6	bdl	bdl	bdl
x-ba1-12	3.75	62.9	14.2	8.7	10.0	2.7	bdl	1.5	bdl
x-ba1-13	1.11	74.9	12.5	5.1	3.3	3.1	bdl	0.4	0.7
x-ba1-14	1.60	74.4	7.3	11.8	2.6	3.1	bdl	0.4	0.4
x-ba2-1	2.40	74.1	15.8	1.3	4.3	4.5	bdl	bdl	bdl
x-ba2-2	3.79	80.6	11.4	1.0	2.6	4.4	bdl	bdl	bdl
x-ba2-3	2.35	74.0	13.3	1.6	8.3	2.8	bdl	bdl	bdl
x-ba2-4	3.72	68.7	12.0	5.7	8.4	2.9	0.7	1.3	0.3
x-ba2-5	2.21	76.7	10.0	5.5	5.0	2.3	bdl	0.5	bdl
x-ba2-6	1.55	73.9	12.5	3.8	6.6	3.2	bdl	bdl	bdl
x-ba2-7	1.19	75.5	10.8	1.6	8.6	3.5	bdl	bdl	bdl
x-ba2-8	2.37	80.5	10.9	3.3	2.4	2.9	bdl	bdl	bdl
x-ba2-9	3.32	75.0	15.6	1.1	4.9	3.1	0.1	0.2	bdl
x-ba2-10	2.02	76.0	11.6	4.9	2.3	5.2	bdl	bdl	bdl
x-ba2-11	1.36	70.7	14.7	1.6	10.0	3.0	bdl	bdl	bdl
x-ba2-12	2.02	72.5	13.0	6.5	4.4	2.7	bdl	0.9	bdl
x-ba2-13	1.58	71.8	12.4	3.9	8.4	3.5	bdl	bdl	bdl
x-ba2-14	1.05	74.4	13.3	3.3	5.0	3.4	bdl	0.6	bdl
Average	2.29	72.6	12.4	5.8	5.6	3.0	0.3	0.2	0.1

ROM, residual organic matter; bdl, below detection limit.

Table S9. Mineralogical compositions of the fine fly ashes from the Damo Power Plant (%).

Sample	ROM (%)	Glass	Hematite	Quartz	Illite	Gypsum	Anhydrite	Siderite
d-fa(f)-2	11.01	71.5	13.7	10.0	3.3	bdl	1.5	bdl
d-fa(f)-3	10.48	70.1	12.8	10.0	5.8	bdl	1.3	bdl
d-fa(f)-4	12.37	79.7	9.4	4.9	2.3	2.9	0.6	0.2
d-fa(f)-5	12.45	81.2	9.5	4.4	bdl	2.6	0.7	1.6
d-fa(f)-6	11.78	80.5	8.0	5.5	2.3	2.9	0.7	0.1
d-fa(f)-7	14.43	63.1	15.9	14.3	5.7	bdl	1.0	bdl
d-fa(f)-8	12.66	77.7	9.5	5.8	1.9	4.0	1.1	bdl
d-fa(f)-9	14.03	74.3	6.6	8.3	4.3	6.0	0.5	bdl
d-fa(f)-10	12.52	79.6	9.2	5.6	2.0	3.0	0.6	bdl
d-fa(f)-11	12.76	79.5	9.6	4.4	2.4	2.8	1.3	bdl
d-fa(f)-12	12.38	79.1	11.4	4.3	1.4	2.8	1.0	bdl
Average	12.44	76.0	10.5	7.1	2.9	2.5	0.9	0.2

ROM, residual organic matter; bdl, below detection limit.

Table S10. Mineralogical compositions of the coarse fly ashes from the Damo Power Plant (%).

Sample No.	ROM (%)	Glass phase	Hematite	Quartz	Illite	Gypsum	Anhydrite
d-fa(c)-2	12.57	73.6	11.0	11.3	1.3	2.4	0.4
d-fa(c)-3	13.39	76.6	11.8	6.3	2.2	2.7	0.4
d-fa(c)-4	9.53	71.8	13.0	9.6	3.4	1.4	0.8
d-fa(c)-5	10.28	73.7	13.2	8.5	2.3	1.5	0.8
d-fa(c)-6	13.61	61.9	19.8	13.6	2.7	1.1	0.9
d-fa(c)-7	7.60	63.1	16.6	14.0	3.8	2.0	0.5
d-fa(c)-8	12.44	66.4	16.1	10.0	5.0	1.6	0.9
d-fa(c)-9	10.98	73.0	13.5	11.3	0.9	bdl	1.3
d-fa(c)-10	11.13	73.3	14.1	7.6	2.4	1.8	0.8
d-fa(c)-11	10.49	69.0	14.7	11.4	3.3	0.6	1.0
d-fa(c)-12	11.54	74.5	14.1	9.4	0.2	1.0	0.8
Average	11.23	70.6	14.4	10.3	2.5	1.5	0.8

ROM, residual organic matter; bdl, below detection limit.

Table S11. Mineralogical compositions of the bottom ashes from the Damo Power Plant (%).

Sample No.	ROM (%)	Glass phase	Quartz	Hematite	Illite	Anhydrite	Rutile
d-ba-1	3.27	75.3	15.9	2.2	6.0	0.6	bdl
d-ba-2	6.66	57.1	19.8	5.2	14.1	3.8	bdl
d-ba-3	5.03	56.5	28.0	5.7	8.9	0.9	bdl
d-ba-4	3.32	69.0	16.1	2.3	11.9	0.7	bdl
d-ba-5	3.40	59.7	19.2	3.3	16.7	1.1	bdl
d-ba-6	2.34	69.0	18.9	5.0	5.9	0.6	0.6
d-ba-7	1.43	68.4	21.2	3.4	6.1	0.9	bdl
d-ba-8	5.24	76.7	15.4	3.3	4.0	0.6	bdl
d-ba-9	7.12	46.5	33.2	4.0	15.3	1.0	bdl
d-ba-10	5.06	50.3	32.0	4.4	12.3	1.0	bdl
d-ba-11	2.15	63.2	22.9	4.8	8.5	0.6	bdl
d-ba-12	3.22	66.1	21.8	4.2	4.2	0.5	3.2
Average	4.02	63.2	22.0	4.0	9.5	1.0	0.3

ROM, residual organic matter; bdl, below detection limit.

Table S12. Concentrations of trace (μg/g) and major (%) elements in the fly ashes from the Xilaifeng Power Plant.

Element	x-fa1-1	x-fa1-2	x-fa1-3	x-fa1-4	x-fa1-5	x-fa1-6	x-fa1-7	x-fa1-8	x-fa1-9	x-fa1-10	x-fa1-11	x-fa1-12	x-fa1-13	x-fa1-14
Li	348.39	324.93	271.80	261.70	256.00	249.60	263.00	251.00	301.60	305.00	345.40	307.60	358.40	412.10
Be	7.13	5.61	5.72	5.46	5.44	5.59	5.72	5.33	5.51	5.53	6.31	5.56	6.71	7.95
F	858	941	966	1005	990	966	860	976	930	930	770	908	862	1016
Sc	22.54	22.33	18.34	18.94	12.64	16.18	16.25	7.53	19.82	20.25	22.24	20.33	23.90	8.24
V	104.59	87.02	83.45	82.36	79.84	78.87	81.96	79.26	90.90	91.36	96.60	91.28	105.49	107.23
Cr	36.84	31.79	31.39	31.99	30.80	30.19	30.98	31.64	35.04	35.89	36.01	35.91	39.97	37.97
Co	11.22	9.82	10.35	10.45	10.17	9.94	10.19	9.78	10.28	10.42	10.93	10.29	11.42	10.56
Ni	25.37	22.97	23.55	23.02	22.68	22.80	22.79	23.31	23.89	23.95	25.72	24.48	26.56	25.03
Cu	42.82	38.92	36.09	35.49	34.42	34.15	35.13	34.15	39.76	40.06	41.26	38.94	44.51	42.79
Zn	77.31	61.27	70.19	72.16	72.71	72.09	69.61	71.08	71.45	72.02	74.73	73.11	75.38	71.43
Ga	50.23	41.57	37.65	37.98	36.92	36.23	38.51	36.49	40.74	40.83	45.78	40.70	48.33	54.18
Ge	3.98	3.01	4.04	3.98	3.96	3.99	4.10	4.00	4.21	4.27	3.52	4.27	4.14	3.97
As	27.99	26.75	25.90	25.75	23.83	24.73	25.34	26.12	24.63	25.03	22.83	25.31	27.08	20.79
Se	19.62	17.90	16.94	16.16	14.95	15.56	15.52	16.72	17.10	16.51	15.86	18.07	16.86	15.34
Rb	27.75	22.74	24.47	25.25	20.08	14.52	25.17	7.45	29.24	29.70	30.20	29.70	33.25	12.55
Sr	635.18	617.62	602.09	616.25	619.33	599.68	610.98	600.69	652.59	653.87	707.09	639.89	724.24	227.02

Y	64.86	60.55	47.88	51.06	45.10	43.93	51.19	31.96	54.85	55.12	60.72	54.58	63.13	52.97
Zr	591.49	506.81	477.16	472.26	458.73	461.50	481.39	461.50	484.17	482.87	553.00	486.80	601.79	754.26
Nb	38.39	32.81	27.62	26.69	26.55	26.25	27.13	26.03	28.42	28.49	32.64	28.74	33.55	42.99
Mo	11.76	10.94	11.31	11.42	11.16	11.03	11.14	11.11	11.01	11.12	11.40	11.17	12.26	10.53
Cd	0.97	0.93	0.87	0.90	0.89	0.88	0.89	0.89	0.94	0.96	0.98	0.92	1.03	1.07
In	0.21	0.19	0.18	0.17	0.18	0.18	0.18	0.17	0.17	0.18	0.21	0.19	0.22	0.26
Sn	7.66	6.80	6.27	6.21	6.25	6.17	6.33	6.12	6.57	6.51	6.97	6.53	7.36	8.24
Sb	1.60	1.39	1.38	1.36	1.36	1.39	1.36	1.34	1.39	1.37	1.41	1.34	1.54	1.54
Cs	2.54	1.98	2.46	2.52	1.98	1.41	2.58	0.61	2.89	2.92	2.90	2.88	3.25	2.33
Ba	394.01	353.66	349.20	351.00	364.58	345.26	372.77	342.04	421.74	426.59	437.50	407.70	449.21	214.95
La	96.59	91.58	71.87	75.94	73.80	67.95	78.20	66.22	86.42	85.25	92.27	83.95	95.67	103.26
Ce	197.51	186.02	149.82	154.39	151.95	143.13	159.35	142.96	174.23	172.65	188.16	169.48	196.40	234.46
Pr	19.82	18.88	15.20	16.12	15.76	15.11	16.63	14.70	18.02	17.77	19.19	17.38	19.99	22.26
Nd	75.19	71.67	58.06	62.00	61.30	59.28	64.32	57.67	68.46	67.88	73.45	66.21	76.48	80.25
Sm	14.15	13.40	11.02	11.91	11.68	11.31	12.27	10.96	12.98	12.77	13.82	12.47	14.36	15.03
Eu	2.64	2.50	2.00	2.14	2.10	2.04	2.20	1.95	2.30	2.30	2.47	2.25	2.58	2.74
Gd	15.29	14.50	12.06	12.88	12.66	12.33	13.33	11.93	13.97	13.78	14.81	13.59	15.37	15.43
Tb	2.17	2.06	1.66	1.81	1.78	1.73	1.86	1.67	1.94	1.94	2.08	1.89	2.15	2.01
Dy	13.38	12.54	10.21	11.02	10.75	10.68	11.46	10.08	11.91	11.80	12.65	11.54	13.26	11.18
Ho	2.45	2.30	1.85	2.03	1.98	1.96	2.08	1.87	2.17	2.17	2.30	2.11	2.43	1.98
Er	7.44	7.09	5.67	6.20	6.02	6.06	6.43	5.59	6.64	6.62	7.00	6.50	7.37	5.81
Tm	1.00	0.95	0.76	0.83	0.81	0.81	0.86	0.75	0.87	0.88	0.94	0.85	0.99	0.79
Yb	7.25	6.80	5.47	5.98	5.85	5.77	6.11	5.24	6.47	6.40	6.72	6.22	7.15	5.54
Lu	1.00	0.92	0.77	0.83	0.79	0.80	0.87	0.72	0.89	0.88	0.94	0.86	0.97	0.72
Hf	15.59	13.93	12.88	12.89	12.71	13.03	13.52	13.04	13.50	13.34	14.25	12.53	14.35	17.11
Ta	2.89	2.57	2.70	2.50	2.41	2.33	2.44	2.35	2.53	2.51	2.66	2.37	2.69	3.15
Hg	1.41	1.29	1.19	1.20	1.18	1.18	1.30	1.15	1.26	1.26	1.31	1.25	1.30	1.29
Tl	0.76	0.63	0.79	0.84	0.83	0.84	0.91	0.84	0.98	0.90	0.75	0.81	0.87	0.92
Pb	83.27	72.13	69.25	72.13	72.49	73.04	76.37	75.36	80.58	73.64	76.55	66.99	78.96	81.40
Bi	1.80	1.55	1.46	1.51	1.45	1.39	1.44	1.36	1.31	1.34	1.66	1.35	1.76	2.04
Th	53.06	49.67	38.52	41.22	36.29	39.94	42.45	25.26	45.75	44.20	47.36	42.90	50.02	18.56
U	15.11	13.98	12.72	12.74	13.02	13.17	13.58	12.91	14.17	13.84	14.31	13.55	15.45	12.83
Na_2O	0.11	0.09	0.08	0.08	0.07	0.07	0.10	0.07	0.17	0.16	0.18	0.17	0.14	0.11
MgO	0.50	0.48	0.57	0.58	0.60	0.59	0.60	0.59	0.61	0.62	0.60	0.62	0.60	0.46
Al_2O_3	32.47	29.46	25.75	25.18	24.95	24.87	25.70	24.60	27.53	27.24	30.03	27.30	30.83	37.08
SiO_2	39.91	34.96	31.43	30.71	30.53	30.42	31.62	30.16	33.97	33.66	36.86	33.70	38.44	45.53
P_2O_5	0.27	0.22	0.21	0.20	0.20	0.20	0.20	0.20	0.19	0.20	0.22	0.20	0.23	0.29
K_2O	0.65	0.54	0.57	0.57	0.57	0.56	0.58	0.56	0.64	0.63	0.66	0.64	0.71	0.78
CaO	5.00	9.43	14.84	15.66	16.02	16.07	14.45	16.08	11.26	11.36	7.42	11.26	7.38	1.51
TiO_2	1.48	1.30	1.18	1.17	1.17	1.16	1.18	1.17	1.21	1.22	1.33	1.21	1.40	1.70
MnO	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02
Fe_2O_3	7.82	6.65	5.77	5.71	5.74	5.70	5.76	5.71	6.48	6.49	7.12	6.51	7.16	6.49
ROM (%)	6.07	7.23	6.78	6.98	8.47	8.65	8.86	9.28	8.39	8.58	8.44	8.62	6.36	3.95

Continued Table S12

x-fa2-1	x-fa2-2	x-fa2-3	x-fa2-4	x-fa2-5	x-fa2-6	x-fa2-7	x-fa2-8	x-fa2-9	x-fa2-10	x-fa2-11	x-fa2-12	x-fa2-13	x-fa2-14	Average
334.40	385.80	368.30	281.20	259.10	377.40	385.70	372.00	330.10	369.00	424.40	303.40	318.20	342.68	325.29
7.54	7.78	7.61	5.69	5.42	8.68	7.96	7.88	6.31	8.00	7.58	5.61	5.80	6.66	6.50
820	1008	855	986	970	897	1259	1021	911	1016	932	867	748	845	933
18.98	17.18	7.89	14.13	18.47	22.66	22.06	23.04	22.97	24.27	24.23	20.24	19.46	24.16	18.90
102.49	111.18	109.92	83.73	80.48	123.98	118.03	122.16	106.06	125.06	113.57	91.07	90.73	111.15	98.21
36.94	39.61	38.79	32.45	30.91	46.11	43.01	47.73	42.01	48.03	42.51	35.55	33.79	39.89	36.92
11.23	11.69	11.61	10.31	10.02	13.46	12.08	13.64	11.90	14.32	11.37	10.39	10.23	11.35	11.05
25.24	25.98	26.24	23.35	23.32	30.06	27.85	31.26	27.74	32.06	26.07	26.35	23.41	26.12	25.40

42.37	46.64	46.11	35.07	34.58	48.12	47.49	49.26	43.25	50.82	47.11	37.85	40.35	45.68	41.19
77.60	79.63	82.12	67.96	72.08	80.72	73.23	102.30	78.40	97.73	77.13	71.01	73.20	84.41	75.79
48.01	53.18	52.29	39.28	37.09	58.10	55.03	54.20	46.21	53.22	53.55	40.22	41.64	48.51	45.24
4.17	3.98	3.96	4.08	4.00	6.28	4.96	4.73	4.28	4.96	4.08	4.37	3.75	3.64	4.17
25.11	25.92	22.62	22.85	22.93	29.27	25.52	26.57	23.37	26.15	23.59	22.49	22.63	22.40	24.77
18.67	19.31	16.07	16.65	16.62	19.51	24.66	18.62	16.08	19.47	17.08	17.81	14.44	17.78	17.35
15.82	14.21	8.76	24.99	24.78	20.18	16.94	22.74	35.09	28.73	25.69	29.12	28.32	28.47	23.43
639.24	521.49	557.86	612.71	623.38	613.83	496.71	579.49	668.40	694.64	677.31	645.67	679.89	661.64	613.53
55.96	55.64	44.04	47.82	50.20	68.89	66.68	67.92	60.28	69.42	66.01	53.65	54.91	63.47	55.81
634.34	705.00	687.25	476.56	453.02	704.45	699.41	651.20	560.00	651.01	666.54	490.37	520.40	595.98	563.19
27.79	38.54	37.95	28.28	26.27	39.05	39.11	37.14	31.69	36.21	38.47	28.72	30.14	35.31	32.18
11.13	12.66	12.63	11.04	11.04	13.70	12.95	14.28	12.12	14.94	12.41	10.98	10.70	11.48	11.77
0.95	1.11	1.08	0.89	0.88	1.22	1.16	1.16	0.98	1.16	1.10	0.88	0.85	1.08	0.99
0.22	0.25	0.25	0.18	0.18	0.25	0.25	0.25	0.20	0.23	0.26	0.18	0.20	0.24	0.21
7.18	8.25	8.19	6.54	6.15	8.36	8.25	8.20	7.07	7.98	8.34	6.63	6.89	7.59	7.13
1.32	2.46	1.76	1.39	1.32	1.86	1.76	1.73	1.45	1.67	1.73	1.35	1.41	1.52	1.52
2.12	2.18	1.99	2.50	2.53	3.02	2.70	3.27	3.40	3.61	3.18	2.87	2.73	2.70	2.57
338.85	360.70	279.98	354.01	360.74	457.27	359.94	390.70	405.44	410.38	390.62	402.11	406.63	411.48	377.11
83.92	104.75	71.76	75.18	74.89	92.33	94.00	92.37	91.12	96.48	93.52	82.48	85.27	94.87	85.78
167.57	233.40	141.42	153.03	151.49	176.71	185.91	178.98	186.58	186.43	194.96	166.85	173.37	194.23	175.41
17.87	22.13	16.58	15.85	15.72	19.76	20.23	19.92	19.10	20.50	19.91	17.17	17.70	19.63	18.18
67.96	79.37	64.05	61.01	60.69	75.99	76.69	76.69	72.86	78.72	76.34	65.57	67.73	73.92	69.28
13.07	14.89	12.50	11.63	11.52	14.68	14.70	14.75	13.85	15.10	14.37	12.34	12.74	13.89	13.15
2.33	2.81	2.20	2.11	2.10	2.67	2.64	2.68	2.46	2.75	2.57	2.19	2.28	2.40	2.37
13.74	15.68	13.01	12.57	12.62	15.66	15.82	15.81	14.81	16.13	15.40	13.21	13.63	14.87	14.10
1.97	2.07	1.91	1.76	1.77	2.26	2.22	2.25	2.05	2.31	2.20	1.86	1.90	2.08	1.98
12.07	11.65	11.84	10.77	10.83	14.04	13.65	13.82	12.36	14.17	13.53	11.31	11.63	12.58	12.03
2.24	2.04	2.17	1.97	1.98	2.61	2.50	2.55	2.27	2.59	2.49	2.06	2.14	2.31	2.20
6.87	5.97	6.63	6.00	6.09	7.98	7.75	7.76	6.90	8.00	7.67	6.38	6.50	7.08	6.72
0.93	0.80	0.91	0.81	0.82	1.07	1.05	1.07	0.93	1.07	1.04	0.85	0.87	0.94	0.90
6.66	5.60	6.48	5.76	5.84	7.77	7.60	7.52	6.64	7.72	7.43	6.03	6.32	6.75	6.47
0.93	0.74	0.90	0.80	0.81	1.07	1.06	1.05	0.93	1.08	1.04	0.83	0.88	0.92	0.89
14.63	17.00	17.16	12.29	12.22	17.35	17.68	16.95	14.38	16.78	17.35	13.32	14.33	15.76	14.64
2.03	3.28	3.13	2.35	2.26	3.17	3.15	3.16	2.62	3.05	3.28	2.45	2.64	3.21	2.71
1.51	1.40	1.20	1.23	1.22	1.43	2.21	1.28	1.25	1.22	1.55	1.32	1.14	1.50	1.32
0.90	0.79	0.74	0.84	0.82	1.13	1.11	1.07	0.99	1.06	0.95	0.89	0.80	0.87	0.88
82.74	90.81	92.30	73.38	69.53	99.45	100.30	97.49	80.23	92.41	100.30	74.13	77.99	94.44	81.35
1.85	2.20	2.20	1.59	1.47	2.35	2.12	2.12	1.66	2.14	2.23	1.40	1.60	1.81	1.72
40.96	32.16	26.73	38.23	41.06	46.83	45.96	45.44	46.08	47.24	50.22	42.15	44.97	47.83	41.82
13.74	14.35	14.57	12.55	12.73	17.35	16.56	17.18	14.61	17.63	16.36	13.28	13.33	14.09	14.28
0.12	0.11	0.08	0.07	0.08	0.13	0.13	0.22	0.21	0.21	0.29	0.32	0.16	0.29	0.14
0.50	0.50	0.57	0.59	0.58	0.52	0.49	0.56	0.61	0.58	0.53	0.63	0.63	0.53	0.57
32.24	35.09	26.32	25.09	25.27	35.32	35.32	35.05	29.56	34.81	35.74	27.21	28.31	31.38	29.63
39.49	42.97	32.33	30.73	31.09	45.38	44.42	44.98	36.92	44.65	45.03	33.61	34.79	38.09	36.66
0.26	0.29	0.21	0.21	0.20	0.29	0.28	0.27	0.21	0.26	0.27	0.19	0.21	0.24	0.23
0.65	0.67	0.58	0.56	0.57	0.75	0.74	0.82	0.71	0.83	0.76	0.65	0.65	0.66	0.65
5.34	2.29	14.16	15.77	15.60	1.24	1.58	1.20	8.47	1.26	1.00	11.25	12.36	6.99	9.15
1.47	1.61	1.25	1.16	1.16	1.65	1.62	1.56	1.30	1.53	1.61	1.23	1.32	1.48	1.35
0.02	0.03	0.02	0.02	0.02	0.03	0.02	0.03	0.02	0.03	0.03	0.02	0.02	0.02	0.02
7.78	7.73	6.00	5.70	5.64	8.39	7.78	8.53	7.04	8.75	8.37	6.68	6.19	6.84	6.80
6.88	5.84	7.63	8.49	8.40	4.69	5.53	5.04	7.07	5.30	4.92	8.57	5.75	7.26	7.07

ROM, residual organic matter.

Table S13. Concentrations of trace (μg/g) and major (%) elements in the bottom ashes

from the Xilaifeng Power Plant.

Element	x-ba1-1	x-ba1-2	x-ba1-3	x-ba1-4	x-ba1-5	x-ba1-6	x-ba1-7	x-ba1-8	x-ba1-9	x-ba1-10	x-ba1-11	x-ba1-12	x-ba1-13	x-ba1-14
Li	290.47	285.34	306.38	269.61	275.19	298.59	291.43	289.61	256.02	270.53	285.07	290.45	293.94	300.39
Be	3.86	3.81	4.03	3.67	3.99	4.12	4.43	3.83	3.74	3.51	4.04	3.91	3.95	4.48
F	158	167	153	187	182	150	164	156	148	128	161	163	106	108
Sc	4.46	14.40	12.13	14.76	13.41	15.36	11.39	10.24	14.69	14.30	12.17	12.73	9.57	6.26
V	79.41	79.89	79.85	86.12	86.43	83.43	85.22	84.50	93.68	81.09	88.57	82.33	86.03	87.69
Cr	39.95	44.73	37.92	44.44	42.41	43.38	39.79	44.76	52.72	39.97	46.93	39.58	41.20	52.52
Co	9.70	11.98	14.17	41.22	8.72	9.18	16.44	8.42	10.30	11.73	9.27	12.74	15.17	8.83
Ni	22.09	34.01	40.65	128.72	22.11	23.22	48.34	21.27	24.37	30.97	24.85	36.73	44.10	23.04
Cu	26.67	26.28	25.89	25.92	26.79	27.50	28.69	26.91	28.58	25.56	29.56	26.63	28.96	30.16
Zn	57.56	57.35	53.71	61.83	53.57	60.14	59.64	62.36	64.06	63.35	62.78	54.47	55.32	67.93
Ga	38.95	38.08	40.32	37.26	40.69	41.22	42.53	41.01	37.43	36.25	39.69	39.84	40.82	42.89
Ge	1.87	1.95	2.15	2.02	2.77	2.46	2.97	2.50	2.30	2.26	2.06	2.34	2.33	2.76
As	7.45	7.01	7.89	4.61	7.09	6.43	7.20	4.64	5.59	5.47	6.69	6.04	7.38	8.68
Se	1.44	1.74	1.88	1.14	1.21	1.09	1.19	1.02	1.15	1.30	0.93	0.81	0.84	0.79
Rb	19.38	39.74	35.94	46.25	41.72	39.83	24.36	33.51	50.62	42.26	38.50	39.34	25.84	18.38
Sr	184.22	205.66	200.32	184.34	167.54	216.75	203.30	161.57	195.78	280.88	225.32	193.83	159.11	234.58
Y	20.60	32.34	32.16	32.66	32.62	33.79	32.11	30.61	32.67	33.03	34.17	32.19	31.27	27.73
Zr	324.39	319.00	331.73	311.66	323.60	326.04	384.25	316.76	289.55	292.58	330.03	303.37	319.95	406.96
Nb	26.23	25.58	26.49	26.10	25.77	26.17	28.52	25.57	23.61	23.21	25.91	25.07	26.99	28.45
Mo	3.71	3.78	4.32	4.30	5.10	4.57	4.69	3.87	4.37	4.09	4.65	4.65	4.84	5.75
Cd	0.54	0.55	0.57	0.58	0.62	0.62	0.70	0.60	0.55	0.57	0.58	0.53	0.56	0.69
In	0.14	0.14	0.15	0.13	0.14	0.16	0.16	0.14	0.14	0.15	0.15	0.14	0.15	0.18
Sn	5.51	5.20	5.39	5.28	5.29	5.38	5.75	5.28	5.20	5.00	5.41	5.11	5.76	6.31
Sb	0.69	0.66	0.70	0.64	0.69	0.73	0.75	0.63	0.68	0.73	0.77	0.64	0.70	0.89
Cs	2.78	3.46	3.47	4.22	4.02	3.72	3.19	3.79	4.44	3.74	3.81	3.76	3.24	2.83
Ba	177.70	218.87	204.05	218.77	216.92	220.50	218.58	184.15	235.40	242.94	229.09	216.36	208.73	231.93
La	35.98	46.14	48.29	51.09	51.10	53.01	47.93	43.22	52.92	59.62	52.58	51.04	45.87	43.99
Ce	89.12	99.50	103.55	109.63	108.07	112.44	108.56	92.55	113.65	122.04	111.09	107.61	89.05	108.36
Pr	9.06	10.41	10.89	11.60	11.21	11.73	11.09	9.85	11.88	12.55	11.69	11.35	10.61	11.03
Nd	35.17	39.81	41.29	44.07	42.63	44.64	42.76	37.76	45.49	47.52	44.83	43.25	40.90	43.53
Sm	6.60	7.48	7.64	8.11	7.81	8.10	7.97	7.04	8.30	8.52	8.36	7.89	7.58	8.41
Eu	1.14	1.31	1.33	1.40	1.35	1.42	1.38	1.24	1.47	1.49	1.47	1.35	1.32	1.42
Gd	6.83	7.72	7.92	8.24	8.04	8.49	8.24	7.36	8.56	8.98	8.69	8.39	7.75	8.64
Tb	0.95	1.10	1.09	1.13	1.10	1.15	1.15	1.03	1.14	1.17	1.18	1.11	1.05	1.20
Dy	5.75	6.52	6.58	6.68	6.64	6.79	6.95	6.16	6.71	6.74	6.91	6.66	6.27	7.14
Ho	1.04	1.17	1.18	1.19	1.20	1.24	1.27	1.12	1.21	1.21	1.24	1.18	1.16	1.29
Er	3.21	3.60	3.61	3.59	3.68	3.78	3.88	3.40	3.67	3.79	3.84	3.65	3.53	4.06
Tm	0.43	0.49	0.49	0.49	0.49	0.51	0.53	0.46	0.50	0.50	0.52	0.49	0.48	0.55
Yb	3.07	3.53	3.48	3.55	3.60	3.62	3.82	3.31	3.52	3.60	3.71	3.55	3.37	3.86
Lu	0.42	0.48	0.49	0.48	0.50	0.51	0.52	0.46	0.49	0.51	0.49	0.48	0.47	0.52
Hf	9.98	10.04	10.37	9.84	10.23	10.49	11.51	9.95	9.17	9.23	10.28	9.78	10.02	12.03
Ta	2.44	2.35	2.44	2.51	2.28	2.35	2.62	2.25	2.11	2.09	2.27	2.28	2.35	2.49
Hg	0.002	0.002	0.003	0.002	0.003	0.002	0.003	0.003	0.002	0.002	0.003	0.003	0.002	0.004
Tl	0.68	0.64	0.85	0.75	1.00	0.86	0.81	0.72	0.76	0.57	0.66	0.77	0.77	0.66
Pb	47.06	45.50	47.44	42.49	47.59	50.92	54.08	46.94	44.87	48.65	46.41	47.47	45.60	57.72
Bi	1.07	0.96	1.05	0.89	1.08	1.14	1.26	0.94	1.00	1.09	1.05	1.02	1.00	1.32
Th	14.21	26.01	26.24	25.66	27.47	28.11	23.26	24.14	24.21	24.82	25.17	25.95	22.57	17.84
U	7.69	7.86	8.47	8.95	9.13	8.75	8.63	7.91	7.46	7.56	7.76	8.09	7.53	9.13
Na_2O	0.24	0.08	0.08	0.09	0.11	0.09	0.10	0.08	0.12	0.16	0.12	0.09	0.11	0.12
MgO	1.00	0.67	0.60	0.66	0.59	0.66	0.67	0.60	0.76	1.03	0.68	0.63	0.69	0.78
Al_2O_3	30.59	30.40	31.66	29.61	30.15	30.51	31.09	31.31	29.34	27.67	31.38	30.58	33.19	31.73
SiO_2	44.90	45.76	46.47	47.18	46.47	45.19	45.08	49.02	48.19	42.78	48.09	46.09	49.43	43.54

P_2O_5	0.10	0.10	0.09	0.09	0.09	0.10	0.10	0.09	0.09	0.11	0.10	0.09	0.10	0.11
K_2O	0.95	0.99	0.91	1.10	1.03	0.97	0.91	1.12	1.23	0.98	1.07	0.95	1.02	0.83
CaO	7.22	6.50	5.94	5.97	5.97	7.30	6.88	5.13	5.28	8.56	4.33	5.68	3.52	6.91
TiO_2	1.13	1.11	1.11	1.15	1.08	1.15	1.14	1.08	1.05	1.02	1.10	1.05	1.13	1.15
MnO	0.03	0.03	0.02	0.02	0.03	0.03	0.02	0.02	0.02	0.03	0.02	0.02	0.03	0.03
Fe_2O_3	3.88	3.45	3.65	3.28	3.84	3.68	3.51	3.31	3.77	4.06	4.01	3.57	4.00	3.82
ROM (%)	1.96	2.77	1.70	4.16	2.69	1.22	1.54	2.06	2.95	3.03	2.55	3.75	1.11	1.60

Continued Table S13

x-ba2-1	x-ba2-2	x-ba2-3	x-ba2-4	x-ba2-5	x-ba2-6	x-ba2-7	x-ba2-8	x-ba2-9	x-ba2-10	x-ba2-11	x-ba2-12	x-ba2-13	x-ba2-14	Average
319.40	289.53	299.19	280.11	263.27	315.32	337.17	311.48	284.84	296.57	228.69	268.01	282.35	291.29	288.22
3.90	3.63	3.82	3.72	3.89	5.12	4.79	4.02	3.89	4.06	3.79	4.01	4.01	3.91	4.00
99	164	242	169	185	92	106	113	141	100	146	166	117	152	147
7.18	2.32	5.98	13.50	7.69	10.01	9.14	8.62	14.72	4.06	7.13	6.94	9.35	6.47	9.96
92.04	80.21	85.91	81.75	87.85	105.47	100.62	87.57	108.77	91.27	81.68	74.81	78.50	72.80	86.20
50.13	39.67	44.75	41.34	45.44	49.91	51.62	42.57	62.52	46.69	39.06	33.82	40.69	34.08	44.02
9.43	16.06	8.81	15.64	8.76	31.06	11.77	20.72	14.08	21.30	8.83	9.89	7.79	21.38	14.05
25.47	47.88	21.72	46.05	21.93	96.58	30.55	61.91	29.73	64.44	21.57	27.76	20.37	68.04	39.59
29.37	24.61	27.51	24.76	26.57	33.67	32.29	28.32	33.32	30.61	26.44	24.66	26.47	23.79	27.73
59.03	53.66	49.32	64.92	52.28	66.25	55.89	51.45	65.84	54.75	48.81	49.30	52.09	47.84	57.34
39.44	36.60	40.34	37.17	40.70	45.60	46.26	41.64	40.16	39.86	35.26	38.92	39.42	38.08	39.87
2.18	1.63	2.09	1.96	2.68	4.15	2.90	2.62	2.17	1.95	2.17	2.30	2.13	2.20	2.35
6.87	6.26	8.01	4.55	7.08	12.80	15.00	6.87	5.74	4.79	6.61	6.43	6.69	5.61	6.98
0.43	0.69	0.68	1.07	1.29	1.21	0.58	0.77	0.91	0.58	0.59	0.82	0.92	1.05	1.00
29.18	18.96	25.07	42.54	29.15	31.95	21.84	27.22	54.80	15.22	42.18	15.36	24.43	18.73	31.87
85.19	47.52	96.27	167.71	123.61	193.16	144.41	151.38	181.63	67.12	114.87	126.03	141.40	103.23	162.74
19.78	16.19	25.10	30.58	30.54	37.56	29.90	26.99	33.76	19.26	24.48	28.18	29.44	15.63	28.76
302.86	288.72	328.01	296.38	321.95	448.18	417.09	344.94	306.05	291.54	315.12	340.19	340.26	319.99	330.04
26.63	25.87	26.53	25.28	25.77	29.84	30.81	26.89	25.17	19.78	28.41	29.31	29.35	29.27	26.52
4.85	4.91	4.59	4.47	5.13	7.54	6.70	5.06	4.86	3.96	4.56	4.41	4.52	4.71	4.75
0.54	0.49	0.54	0.52	0.60	0.81	0.68	0.55	0.57	0.51	0.42	0.48	0.43	0.43	0.57
0.15	0.12	0.14	0.12	0.14	0.21	0.19	0.15	0.14	0.12	0.13	0.14	0.14	0.14	0.15
5.67	5.13	5.55	4.83	5.29	6.77	6.53	5.70	5.42	5.00	5.57	5.51	5.72	5.57	5.50
0.65	0.56	0.64	0.53	0.62	0.91	0.82	0.64	0.58	0.52	0.65	0.72	0.72	0.63	0.68
3.40	2.88	3.21	3.89	3.83	4.11	3.29	3.51	5.68	3.25	4.13	3.06	3.35	3.29	3.62
143.13	77.34	141.61	188.57	142.85	224.05	137.99	171.05	234.40	90.94	158.35	152.02	176.57	131.57	185.52
44.32	40.06	31.23	46.35	46.19	51.46	32.59	34.24	52.21	44.86	38.48	44.13	42.73	39.63	45.40
105.23	93.72	61.73	98.91	95.53	115.22	101.91	85.15	119.51	103.02	82.06	61.79	70.65	89.44	98.54
10.27	9.21	7.09	10.42	10.26	11.62	7.66	7.81	11.69	10.40	8.82	10.02	9.61	8.99	10.32
37.20	33.18	27.63	40.07	38.83	45.33	29.03	29.69	44.63	37.99	34.07	39.07	37.57	32.87	39.31
6.73	5.86	5.28	7.33	7.11	8.55	5.87	5.78	8.03	6.80	6.19	7.27	7.09	5.83	7.27
1.25	1.10	0.91	1.30	1.21	1.48	1.03	1.02	1.45	1.28	1.06	1.27	1.26	1.07	1.28
6.73	5.87	5.65	7.71	7.50	8.87	6.31	6.22	8.31	6.79	6.02	7.09	6.97	5.67	7.48
0.83	0.71	0.81	1.04	1.02	1.22	0.91	0.87	1.13	0.82	0.82	0.94	0.95	0.69	1.01
4.37	3.64	4.90	6.23	6.08	7.33	5.55	5.35	6.64	4.27	5.00	5.82	6.02	3.51	5.97
0.73	0.60	0.90	1.12	1.12	1.34	1.03	0.95	1.21	0.70	0.89	1.02	1.10	0.59	1.07
2.10	1.67	2.78	3.48	3.44	4.13	3.24	2.95	3.74	1.95	2.75	3.19	3.38	1.69	3.28
0.27	0.21	0.38	0.47	0.47	0.57	0.44	0.40	0.51	0.25	0.36	0.44	0.45	0.22	0.44
1.89	1.40	2.76	3.33	3.35	4.07	3.21	2.91	3.61	1.64	2.64	3.14	3.30	1.42	3.15
0.23	0.19	0.37	0.46	0.46	0.57	0.45	0.39	0.48	0.21	0.36	0.44	0.45	0.19	0.43
9.52	9.56	10.27	9.62	10.21	13.03	12.25	10.43	9.34	9.26	9.53	10.33	10.19	10.07	10.23
2.63	2.36	2.31	2.29	2.27	2.74	2.56	2.41	2.19	1.56	2.57	2.61	2.48	2.55	2.37
0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.003	0.001	0.002	0.002	0.002	0.003	0.002
0.78	0.61	0.80	0.78	1.00	1.17	0.94	0.82	0.72	0.67	0.64	0.53	0.55	0.55	0.75

38.39	34.72	37.66	43.93	43.51	61.69	56.48	43.92	42.40	39.65	37.02	36.43	36.96	33.24	44.96
1.04	0.81	0.96	0.90	0.96	1.36	1.13	0.82	0.86	0.71	0.86	0.97	0.94	0.97	1.01
16.21	5.95	17.20	25.71	24.02	27.25	21.18	20.21	24.03	5.51	18.70	21.35	19.75	17.88	21.45
6.12	5.99	7.51	8.23	8.71	10.61	9.28	8.10	8.08	6.88	7.38	7.14	6.78	5.34	7.90
0.10	0.11	0.09	0.07	0.09	0.12	0.11	0.10	0.11	0.09	0.11	0.08	0.10	0.09	0.11
0.59	0.47	0.53	0.63	0.49	0.63	0.55	0.59	0.66	0.57	0.65	0.70	0.63	0.60	0.65
34.40	34.51	34.74	30.79	32.34	34.47	37.00	35.01	32.74	34.75	34.45	31.28	33.40	33.71	32.24
52.86	52.93	53.75	47.77	49.28	50.81	52.27	53.13	53.80	54.08	54.05	46.82	51.09	49.92	48.96
0.10	0.09	0.09	0.08	0.09	0.11	0.11	0.10	0.11	0.09	0.10	0.10	0.10	0.10	0.10
1.07	1.03	1.04	1.03	0.98	0.95	0.92	1.02	1.37	1.11	1.18	1.01	1.03	1.01	1.03
1.02	0.63	0.91	5.36	4.08	2.28	0.86	0.85	0.91	0.81	1.07	5.00	2.71	3.36	4.11
1.09	1.06	1.10	1.05	1.06	1.21	1.24	1.08	1.10	1.06	1.09	1.09	1.10	1.07	1.10
0.03	0.02	0.03	0.03	0.02	0.03	0.02	0.02	0.03	0.02	0.02	0.02	0.03	0.02	0.03
4.63	4.27	3.88	3.38	3.54	4.18	4.15	4.00	4.24	3.90	3.96	3.42	3.63	3.78	3.81
2.40	3.79	2.35	3.72	2.21	1.55	1.19	2.37	3.32	2.02	1.36	2.02	1.58	1.05	2.29

ROM, residual organic matter.

Table S14. Concentrations of trace (μg/g) and major (%) elements in the fine fly ashes from the Damo Power Plant.

Element	d-fa(f)-2	d-fa(f)-3	d-fa(f)-4	d-fa(f)-5	d-fa(f)-6	d-fa(f)-7	d-fa(f)-8	d-fa(f)-9	d-fa(f)-10	d-fa(f)-11	d-fa(f)-12	Average
Li	161.80	192.00	257.39	263.17	220.66	178.93	246.86	215.05	255.45	249.94	245.64	226.08
Be	5.21	5.38	6.26	6.24	5.93	4.89	6.65	6.66	6.19	6.04	6.02	5.95
F	521	561	914	860	673	643	833	662	933	884	773	751
Sc	8.28	10.42	13.49	13.18	10.34	10.66	13.79	12.41	14.49	14.96	11.58	12.15
V	114.14	109.88	84.05	84.15	80.80	117.86	86.72	90.72	84.01	83.12	81.31	92.43
Cr	49.40	49.92	31.42	29.60	35.18	58.81	31.11	35.81	30.34	29.36	27.33	37.12
Co	11.41	10.42	8.29	8.31	8.04	13.94	8.99	9.87	8.64	8.02	7.66	9.42
Ni	28.15	27.13	23.44	21.83	24.48	33.20	25.68	28.17	28.56	21.18	20.38	25.65
Cu	56.08	56.19	44.15	41.77	48.51	55.14	51.80	42.04	44.44	42.15	40.81	47.55
Zn	69.23	63.58	66.94	59.81	84.82	93.00	102.28	86.76	70.60	72.26	59.82	75.37
Ga	31.80	34.15	39.49	39.70	35.43	31.04	37.94	34.60	39.29	37.97	39.43	36.44
Ge	4.11	3.34	2.04	4.21	3.09	3.72	3.75	4.42	4.11	2.94	3.98	3.61
As	28.11	27.52	37.86	38.86	28.35	32.55	34.12	27.96	36.69	34.46	37.62	33.10
Se	11.87	12.16	13.95	14.01	9.96	13.61	12.89	11.17	12.97	12.90	12.66	12.56
Rb	34.02	21.78	9.15	9.76	8.69	21.47	8.73	16.29	9.28	8.64	7.36	14.11
Sr	154.91	130.56	285.72	315.46	205.26	132.05	260.52	167.14	311.31	321.88	290.86	234.15
Y	34.34	40.41	49.20	49.72	33.25	38.82	53.31	47.09	54.32	53.27	41.59	45.03
Zr	392.73	401.72	516.90	518.29	445.45	369.21	523.49	452.12	530.49	484.83	522.47	468.88
Nb	23.53	24.89	28.20	28.10	25.86	22.49	27.73	25.45	28.06	26.88	27.92	26.28
Mo	11.34	11.16	9.80	9.78	7.36	12.22	10.18	9.54	9.86	11.63	9.69	10.23
Cd	0.69	0.72	0.85	0.84	0.77	0.66	0.87	0.80	0.84	0.80	0.84	0.79
In	0.15	0.15	0.17	0.17	0.15	0.13	0.17	0.16	0.17	0.16	0.17	0.16
Sn	5.56	5.77	6.41	6.32	5.82	5.00	6.25	5.98	6.28	6.10	6.34	5.98
Sb	1.15	1.21	1.76	1.92	1.35	1.09	1.73	1.48	1.76	1.72	1.81	1.54
Cs	4.44	3.96	2.08	2.03	1.78	3.71	1.77	2.79	1.92	1.86	1.74	2.55
Ba	346.18	295.02	318.94	329.32	245.75	204.71	298.55	218.43	315.77	276.34	272.48	283.77
La	54.70	56.61	63.84	66.65	63.77	50.13	70.11	58.54	74.16	72.87	80.50	64.72
Ce	124.07	117.91	102.67	107.96	139.95	118.63	108.09	118.15	116.37	124.56	175.20	123.05
Pr	11.84	13.29	13.80	14.39	13.94	12.89	15.07	13.42	15.86	15.63	17.14	14.30
Nd	46.09	51.89	53.02	55.36	51.00	52.00	58.66	52.51	61.07	59.95	61.96	54.86
Sm	8.37	9.73	10.22	10.50	9.65	9.57	11.14	10.12	11.47	11.27	11.61	10.33
Eu	1.52	1.74	1.82	1.85	1.80	1.70	1.95	1.78	2.01	1.98	2.08	1.84
Gd	8.94	10.22	10.93	11.16	10.12	9.88	11.66	10.83	12.25	11.89	12.15	10.91

Tb	1.14	1.31	1.51	1.55	1.30	1.28	1.63	1.46	1.67	1.65	1.57	1.46
Dy	6.79	7.86	9.45	9.63	7.04	7.63	10.35	9.14	10.60	10.29	8.56	8.85
Ho	1.25	1.44	1.76	1.79	1.22	1.41	1.95	1.70	1.96	1.94	1.54	1.63
Er	3.82	4.52	5.45	5.57	3.59	4.33	6.05	5.25	6.09	5.98	4.50	5.01
Tm	0.51	0.59	0.74	0.75	0.47	0.58	0.81	0.71	0.82	0.80	0.60	0.67
Yb	3.80	4.50	5.53	5.60	3.29	4.36	6.05	5.17	6.07	6.01	4.24	4.97
Lu	0.58	0.68	0.83	0.83	0.45	0.64	0.91	0.78	0.92	0.89	0.58	0.74
Hf	9.88	10.10	13.14	13.23	11.31	9.08	13.05	11.32	13.29	12.49	13.25	11.83
Ta	2.00	2.15	2.44	2.43	2.26	1.83	2.21	1.98	2.41	2.18	2.28	2.20
Hg	0.93	1.12	2.29	2.23	1.91	1.05	2.10	1.30	2.28	2.18	2.32	1.79
Tl	3.06	2.83	2.79	2.82	2.27	2.77	2.44	2.28	2.70	2.51	2.73	2.65
Pb	57.93	58.36	74.06	76.28	65.49	48.58	72.82	56.75	75.19	72.70	73.82	66.54
Bi	1.34	1.42	1.95	2.04	1.44	1.13	1.76	1.39	1.97	2.01	2.01	1.68
Th	25.61	23.58	28.39	30.55	32.85	22.21	36.21	26.68	37.88	37.96	36.76	30.79
U	10.49	10.46	11.77	11.87	11.73	10.73	13.33	11.34	13.08	12.65	12.81	11.84
Na_2O	0.07	0.09	0.46	0.32	0.23	0.22	0.46	1.65	0.44	0.65	0.18	0.44
MgO	0.41	0.40	0.52	0.47	0.48	0.62	0.96	0.94	0.56	0.59	0.38	0.57
Al_2O_3	29.79	30.65	31.32	31.67	32.18	27.28	28.95	28.82	31.39	31.17	31.99	30.47
SiO_2	42.68	43.19	40.36	40.45	43.00	39.77	41.49	41.02	40.34	40.15	40.26	41.16
P_2O_5	0.27	0.28	0.71	0.76	0.57	0.23	0.28	0.30	0.68	0.68	0.76	0.50
K_2O	1.03	0.92	0.56	0.53	0.62	1.09	0.88	1.01	0.55	0.55	0.47	0.75
CaO	0.63	0.69	1.71	1.68	1.31	0.68	0.87	1.02	1.73	1.67	1.69	1.24
TiO_2	1.19	1.20	1.21	1.18	1.14	1.13	1.09	1.14	1.19	1.19	1.20	1.17
MnO	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.01
Fe_2O_3	12.09	11.19	9.11	8.90	7.89	13.35	10.86	8.66	8.91	8.88	9.27	9.92
ROM (%)	11.01	10.48	12.37	12.45	11.78	14.43	12.66	14.03	12.52	12.76	12.38	12.44

ROM, residual organic matter.

Table S15. Concentrations of trace (μg/g) and major (%) elements in the coarse fly ashes from the Damo Power Plant.

Element	d-fa(c)-2	d-fa(c)-3	d-fa(c)-4	d-fa(c)-5	d-fa(c)-6	d-fa(c)-7	d-fa(c)-8	d-fa(c)-9	d-fa(c)-10	d-fa(c)-11	d-fa(c)-12	Average
Li	236.64	240.76	206.03	217.11	170.88	186.76	222.00	183.52	193.37	186.46	201.91	204.13
Be	5.80	5.93	5.46	5.25	5.16	5.17	5.42	5.30	5.52	5.47	5.24	5.43
F	838	1165	607	605	557	573	599	534	659	555	622	665
Sc	13.65	13.24	9.43	11.71	11.76	9.85	11.31	9.98	11.41	10.92	11.36	11.33
V	80.04	81.39	98.70	94.45	117.19	99.10	104.60	112.35	101.19	109.57	101.49	100.01
Cr	32.75	35.48	43.77	46.88	59.70	52.25	47.00	54.50	43.93	52.00	45.38	46.69
Co	22.58	9.04	17.03	10.15	21.65	10.33	21.01	11.12	19.17	11.21	18.77	15.64
Ni	71.15	23.56	50.08	24.97	59.55	26.36	62.96	27.96	56.91	26.88	55.59	44.18
Cu	41.43	42.45	51.41	51.03	55.55	51.94	54.50	55.80	52.80	56.47	51.74	51.37
Zn	86.43	90.33	74.65	72.26	89.14	79.45	75.65	75.07	73.48	78.35	74.39	79.02
Ga	34.54	34.80	33.28	32.92	31.77	32.39	32.46	32.80	33.28	32.82	32.67	33.07
Ge	3.88	4.07	3.80	3.46	2.74	1.91	3.28	2.07	3.73	3.35	3.84	3.28
As	30.54	31.91	25.48	27.08	31.52	24.04	27.47	27.62	27.30	26.27	24.76	27.64
Se	12.37	12.90	10.46	10.97	11.91	8.10	12.49	11.30	12.33	10.65	10.76	11.29
Rb	9.14	9.49	19.65	15.48	29.63	20.66	14.86	22.12	17.58	17.84	16.68	17.56
Sr	263.39	279.15	165.41	167.13	147.63	135.80	152.03	123.66	198.70	122.15	145.93	172.82
Y	45.49	45.71	38.84	41.68	39.57	39.41	42.95	32.40	38.21	37.45	41.90	40.33
Zr	439.64	449.54	406.66	406.68	376.47	384.90	396.64	397.72	418.38	386.07	389.69	404.76
Nb	24.39	25.80	24.11	23.72	23.48	23.36	23.69	23.99	24.77	24.05	23.93	24.12
Mo	9.60	9.93	10.00	11.49	12.44	10.42	14.83	11.13	11.20	11.03	11.77	11.26
Cd	0.78	0.76	0.70	0.71	0.69	0.72	0.72	0.73	0.74	0.70	0.69	0.72
In	0.15	0.16	0.15	0.16	0.14	0.15	0.15	0.15	0.16	0.15	0.15	0.15

Sn	5.75	6.03	5.74	5.72	5.14	5.81	5.59	5.59	5.88	5.64	5.52	5.67
Sb	1.53	1.67	1.28	1.35	1.16	1.32	1.29	1.19	1.34	1.21	1.19	1.32
Cs	2.31	2.33	3.56	3.36	4.74	3.96	3.64	3.86	3.26	3.51	3.28	3.44
Ba	351.66	330.80	300.38	267.59	248.10	307.15	177.92	271.26	321.01	269.48	220.26	278.69
La	60.58	60.54	55.05	64.68	57.45	57.70	54.79	45.18	46.33	75.95	61.19	58.13
Ce	106.28	115.27	120.40	117.71	129.03	109.50	122.60	102.38	116.20	175.48	116.90	121.07
Pr	13.15	13.16	12.92	14.75	13.68	13.33	12.81	10.91	10.68	17.14	14.12	13.33
Nd	51.13	51.19	50.88	57.71	54.12	52.47	50.84	42.56	42.01	62.44	55.31	51.88
Sm	9.78	9.77	9.59	10.81	9.76	9.69	9.67	8.03	8.17	11.49	10.20	9.72
Eu	1.76	1.75	1.72	1.90	1.78	1.75	1.74	1.47	1.51	2.13	1.81	1.76
Gd	10.27	10.40	10.04	10.91	10.11	9.99	10.30	8.22	8.92	11.63	10.54	10.12
Tb	1.41	1.43	1.32	1.44	1.31	1.32	1.37	1.08	1.21	1.46	1.38	1.34
Dy	8.83	9.05	7.95	8.59	7.95	8.08	8.41	6.61	7.66	7.75	8.34	8.11
Ho	1.66	1.69	1.45	1.57	1.47	1.48	1.55	1.20	1.45	1.35	1.52	1.49
Er	5.10	5.26	4.47	4.78	4.58	4.49	4.86	3.72	4.52	4.00	4.71	4.59
Tm	0.71	0.71	0.61	0.64	0.61	0.61	0.66	0.52	0.61	0.52	0.63	0.62
Yb	5.31	5.26	4.45	4.76	4.53	4.53	5.00	3.88	4.53	3.68	4.66	4.60
Lu	0.79	0.80	0.68	0.70	0.68	0.67	0.74	0.59	0.69	0.50	0.69	0.68
Hf	11.43	11.67	10.45	10.48	9.43	9.72	10.15	10.08	11.00	9.98	10.01	10.40
Ta	2.55	2.31	2.02	2.19	3.50	1.93	2.07	2.09	2.25	2.07	2.06	2.28
Hg	1.57	1.70	1.33	1.34	1.07	1.02	1.26	1.10	1.46	1.21	1.31	1.31
Tl	2.49	2.57	2.74	2.70	3.09	2.50	2.59	2.79	2.81	2.62	2.64	2.69
Pb	66.01	66.48	61.88	61.18	51.64	58.82	59.34	55.93	64.81	56.21	56.78	59.92
Bi	1.74	1.75	1.32	1.37	1.14	1.51	1.34	1.39	1.52	1.40	1.30	1.43
Th	33.68	34.39	27.29	29.11	25.14	25.95	26.54	22.46	27.39	26.60	25.33	27.63
U	11.43	12.33	11.47	11.72	11.30	11.40	11.98	11.30	12.45	11.50	11.08	11.63
Na_2O	1.22	1.11	0.19	0.31	0.16	0.24	0.45	0.14	0.30	0.13	0.16	0.40
MgO	0.75	0.69	0.53	0.67	0.53	0.53	0.98	0.47	0.55	0.52	0.80	0.64
Al_2O_3	28.88	29.14	30.81	30.47	26.78	29.51	28.90	29.32	29.75	29.40	29.50	29.31
SiO_2	40.42	39.30	43.81	42.34	40.91	44.80	41.54	42.73	42.01	42.56	42.58	42.09
P_2O_5	0.57	0.58	0.32	0.37	0.20	0.30	0.28	0.26	0.36	0.25	0.31	0.35
K_2O	0.70	0.66	0.85	0.79	1.10	0.98	0.89	1.01	0.83	0.95	0.88	0.88
CaO	2.00	1.75	1.00	1.06	0.68	1.04	0.88	0.74	1.12	1.12	0.92	1.12
TiO_2	1.07	1.11	1.11	1.08	1.10	1.10	1.12	1.17	1.15	1.15	1.08	1.11
MnO	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.02
Fe_2O_3	9.25	10.13	10.55	11.14	13.88	12.54	11.09	12.20	11.36	11.91	10.75	11.35
ROM (%)	12.57	13.39	9.53	10.28	13.61	7.60	12.44	10.98	11.13	10.49	11.54	11.23

ROM, residual organic matter.

Table S16. Concentrations of trace (μg/g) and major (%) elements in the bottom ashes from the Damo Power Plant.

Element	d-ba-1	d-ba-2	d-ba-3	d-ba-4	d-ba-5	d-ba-6	d-ba-7	d-ba-8	d-ba-9	d-ba-10	d-ba-11	d-ba-12	Average
Li	176.38	148.22	120.57	182.10	167.46	148.40	163.99	177.55	130.41	135.98	147.73	144.45	153.60
Be	3.80	3.24	2.95	3.71	3.46	3.52	3.59	3.24	3.15	2.86	3.39	3.14	3.34
F	154	325	194	243	340	179	158	193	255	297	447	189	248
Sc	4.07	4.23	5.67	3.41	3.90	2.38	1.27	5.47	6.06	5.56	4.87	4.77	4.31
V	109.28	95.56	106.15	107.17	112.11	111.49	114.89	83.69	95.01	91.51	99.11	99.36	102.11
Cr	66.12	57.37	76.05	61.23	66.62	64.48	68.13	49.45	70.60	68.00	65.22	61.81	64.59
Co	10.87	21.89	15.31	16.99	12.04	18.99	12.39	18.37	11.95	20.28	12.10	22.86	16.17
Ni	27.34	54.43	42.80	47.98	27.36	53.98	30.21	51.05	28.19	55.15	30.45	65.57	42.88
Cu	40.59	27.77	30.86	36.14	36.25	36.92	37.65	30.08	28.78	26.96	31.67	29.37	32.75
Zn	60.90	86.12	88.90	59.53	58.75	68.36	81.75	54.81	65.31	71.56	100.90	78.77	72.97
Ga	33.89	30.43	26.10	33.61	32.90	31.68	34.03	32.27	28.02	26.83	30.77	28.39	30.74

Ge	2.17	1.63	2.40	2.18	2.21	2.35	2.59	1.46	2.04	1.83	2.25	1.78	2.07
As	5.69	7.41	9.58	5.42	6.27	4.54	4.34	7.22	4.79	8.17	5.07	6.68	6.27
Se	0.48	0.83	1.17	0.55	0.39	0.45	0.39	0.85	1.17	1.25	0.47	0.85	0.74
Rb	41.66	37.36	41.66	33.67	36.75	41.99	31.67	30.18	36.53	36.63	29.80	28.28	35.51
Sr	37.14	39.97	107.64	25.95	36.42	42.36	31.24	55.85	64.05	59.45	56.78	69.07	52.16
Y	4.30	7.83	12.89	5.35	8.05	7.32	23.42	9.10	14.87	9.71	11.79	12.71	10.61
Zr	243.43	258.31	325.94	239.88	231.38	261.79	83.41	227.04	320.52	338.54	297.13	310.10	261.46
Nb	20.82	21.35	19.55	20.84	20.18	20.76	7.65	21.86	21.89	20.87	20.55	20.06	19.70
Mo	2.99	4.21	4.33	3.41	3.06	3.33	3.43	3.57	3.91	4.43	3.98	4.17	3.73
Cd	0.48	0.41	0.53	0.42	0.41	0.46	0.30	0.37	0.46	0.55	0.54	0.52	0.45
In	0.12	0.09	0.08	0.09	0.08	0.08	0.07	0.07	0.08	0.08	0.09	0.08	0.08
Sn	4.85	4.27	3.77	4.70	4.52	4.61	2.24	4.49	3.81	3.71	4.43	3.94	4.11
Sb	0.61	0.58	0.60	0.57	0.53	0.61	1.59	0.59	0.53	0.45	0.99	0.58	0.69
Cs	6.95	5.42	5.05	6.32	6.76	6.58	3.82	4.71	4.84	4.61	5.08	4.52	5.39
Ba	120.22	170.22	186.35	124.40	128.76	149.78	93.19	148.86	150.16	165.71	133.40	100.43	139.29
La	11.14	16.41	25.73	12.39	17.33	17.04	43.54	20.45	33.12	24.05	20.42	23.03	22.05
Ce	45.28	44.25	86.69	30.53	55.11	47.71	54.66	51.34	98.87	77.53	65.17	86.68	61.98
Pr	2.67	4.44	6.53	3.52	4.76	4.45	10.14	5.50	8.16	6.31	5.45	5.04	5.58
Nd	10.41	17.61	26.01	14.07	18.80	17.37	38.41	21.50	31.90	25.18	21.66	19.13	21.84
Sm	1.69	3.16	4.34	2.40	3.21	2.89	6.86	3.41	5.05	3.84	3.32	2.78	3.58
Eu	0.29	0.58	0.78	0.43	0.58	0.57	1.33	0.66	0.99	0.73	0.66	0.54	0.68
Gd	1.69	2.99	4.29	2.22	3.08	2.68	6.91	3.41	5.58	4.17	3.65	3.46	3.68
Tb	0.17	0.35	0.49	0.25	0.35	0.31	0.89	0.40	0.63	0.44	0.45	0.41	0.43
Dy	0.90	1.85	2.63	1.33	1.89	1.70	4.86	2.09	3.38	2.29	2.61	2.49	2.34
Ho	0.16	0.30	0.46	0.22	0.30	0.29	0.90	0.37	0.58	0.40	0.48	0.47	0.41
Er	0.50	0.87	1.44	0.64	0.93	0.86	2.64	1.13	1.78	1.26	1.58	1.57	1.27
Tm	0.07	0.11	0.19	0.08	0.12	0.11	0.38	0.16	0.25	0.16	0.23	0.22	0.17
Yb	0.59	0.84	1.46	0.62	0.90	0.85	2.57	1.19	1.97	1.29	1.88	1.87	1.34
Lu	0.08	0.12	0.21	0.09	0.13	0.12	0.37	0.17	0.28	0.18	0.27	0.27	0.19
Hf	7.14	7.29	8.24	7.21	6.67	7.64	2.66	6.85	8.73	9.50	8.80	8.72	7.45
Ta	1.59	2.46	1.60	2.04	1.82	1.73	0.92	1.86	1.67	1.80	1.74	1.69	1.74
Hg	0.004	0.004	0.009	0.003	0.004	0.003	0.002	0.019	0.004	0.003	0.002	0.004	0.005
Tl	1.68	2.04	2.45	1.26	1.52	1.42	1.23	1.75	1.08	1.93	1.31	1.94	1.64
Pb	37.26	33.61	31.44	30.28	29.60	34.02	34.73	33.24	27.21	26.47	41.66	26.96	32.21
Bi	1.32	0.71	0.66	0.96	0.87	0.94	0.77	0.78	0.50	0.55	0.88	0.78	0.81
Th	4.10	6.33	9.34	4.02	5.71	5.18	1.90	7.66	12.06	10.39	9.66	9.12	7.12
U	7.29	6.36	6.64	6.54	6.65	6.32	7.29	7.80	7.87	8.26	8.59	8.21	7.32
Na_2O	0.10	0.09	0.09	0.11	0.12	0.09	0.10	0.09	0.09	0.07	0.10	0.10	0.10
MgO	0.60	0.48	0.54	0.61	0.66	0.56	0.62	0.48	0.50	0.47	0.63	0.67	0.57
Al_2O_3	31.65	29.81	26.78	31.91	30.77	31.37	31.76	31.76	26.94	27.61	29.43	28.18	29.83
SiO_2	55.56	51.85	52.59	55.76	55.24	56.13	56.70	52.99	55.26	55.18	55.72	53.70	54.72
P_2O_5	0.09	0.10	0.09	0.08	0.08	0.10	0.09	0.10	0.09	0.11	0.08	0.10	0.09
K_2O	1.91	1.61	1.74	1.80	1.97	1.88	1.91	1.38	1.66	1.61	1.72	1.60	1.73
CaO	0.28	0.17	0.23	0.26	0.25	0.21	0.27	0.30	0.31	0.19	0.40	0.43	0.27
TiO_2	1.04	1.05	1.07	1.07	1.01	1.05	1.05	1.01	1.19	1.12	1.07	1.04	1.07
MnO	0.01	0.15	0.02	0.02	0.02	0.01	0.02	0.01	0.02	0.02	0.03	0.04	0.03
Fe_2O_3	5.04	7.81	11.34	4.52	5.98	5.85	5.54	6.07	6.22	8.16	7.90	10.05	7.04
ROM (%)	3.27	6.66	5.03	3.32	3.40	2.34	1.43	5.24	7.12	5.06	2.15	3.22	4.02

ROM, residual organic matter.