Supplementary Materials For Precision Remediation of Mining Soils through On-siteInvestigation and Large-scale Synthesized Ferrosilicate

Han Xu [a,†], **Jie Liu** [b,†], **Na Huang** [a], **Anqing Yu** [b], **Jingyuan Li** [b], **Qiao Li** [b], **Jiyuan Jing**[c] , **Qiunan Yang** [c] **and Lulu Long** [a,*]

a College of Environment Sciences, Sichuan Agricultural University, Chengdu, 611130, China

b Power China of Chengdu Engnieering Corporation Limited, Chengdu, 611130, China

c Nanchong Institute for Food and Drug Control, Nanchong, 637000, China

*Corresponding author:
Lulu Long E-mail: lululong@sicau.edu.cn

† These authors contributed equally to this work.

18   Table S1:Soil pollution risk screening values for agricultural land (Basic items)

19   (mg/Kg)

Serial number	Pollution project[a][b]		Risk screening value			
			PH≤5.5	5＜PH≤6.5	6.5＜PH≤7.5	PH＞7.5
1	Cd	Paddy field	0.3	0.4	0.6	0.8
		Other	0.3	0.3	0.3	0.6
2	Hg	Paddy field	0.5	0.5	0.6	1.0
		Other	1.3	1.8	2.4	3.4
3	As	Paddy field	30	30	25	20
		Other	40	40	30	25
4	Pb	Paddy field	80	100	140	240
		Other	70	90	120	170
5	Cr	Paddy field	250	250	300	350
		Other	150	150	200	250
6	Cu	Orchard	150	150	200	200
		Other	50	50	100	100
7	Ni		60	70	100	190
8	Zn		200	200	250	300

[a] Heavy metals and metal-like AS are counted according to the total amount of elements

[b] The more stringent risk screening values were used for irrigation-drought rotation land

20   Table S2：Speciation classification of heavy metals by BCR method

Abbreviation	Form	Method
S1	Acid-extractable	0.11M CH_3COOH 25℃ 16h
S2	Reducible	0.5M $HONH_3Cl$ pH=2-3 25℃ 16h
S3	Oxidizable	5mL 8.8M H_2O_2 standing 2h 85℃ 2h 5mL 8.8M H_2O_2 85℃ 2h 20mL 1MCH_3COONH_4 25℃ 16h
S4	Residual	$HNO_3+HF+HClO_4$ digest

21   Table S3: The total amount of heavy metals in soil at sampling points within the study
22   area (mg kg^{-1})

Point		Cd	Pb	Zn	Cu	Cr	Ni
1#	Mean	32.11	396.28	1720.37	115.60	191.37	80.21
	SD	7.39	0.95	3.82	1.57	4.28	0.36
2#	Mean	48.68	289.55	1411.43	107.00	189.75	105.73
	SD	6.28	2.53	4.70	3.99	0.72	39.04
3#	Mean	70.05	1167.83	4428.81	146.71	159.66	67.37
	SD	12.54	4.37	60.84	0.10	0.24	2.72
4#	Mean	68.00	971.03	4377.84	130.82	159.52	92.90
	SD	5.00	12.64	63.78	4.46	5.05	22.47
5#	Mean	33.58	452.04	1620.92	107.78	109.02	45.54
	SD	6.38	4.75	13.24	0.64	10.05	0.71
6#	Mean	64.57	854.92	3363.55	126.72	122.16	50.89
	SD	2.04	93.01	379.62	14.89	19.00	4.57
7#	Mean	41.95	268.61	1236.84	103.94	144.63	61.38
	SD	1.09	4.78	18.10	2.36	4.24	3.48

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Table S4：The total amount of heavy metals in the soil of the study area (mg kg^{-1}).

Types	Cd	Pb	Zn	Cu	Cr	Ni
Content (mg kg^{-1})	10.2	192.4	782.5	88.0	176.0	82.4

Table S5: Acid desorption and passivation experiment of soil heavy metals at different pH （mg kg^{-1}）

	Cd	Pb	Zn
pH=5	0.0717±0.0014	0.1418±0.0006	1.7956±0.2250
pH=5.5	0.0168±0.0002	0.0830±0.0151	0.5846±0.0817
pH=6	0.0132±0.0011	0.1225±0.0681	0.7213±0.1270
pH=6.5	0.0097±0.0012	0.1026±0.0185	0.3100±0.0142
pH=7	0.0047±0.0010	0.1154±0.0468	0.3171±0.1109

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25 Table S6: Desorption and passivation experiments of salts with different concentrations of heavy metals in soil （mg kg-1）

Concentration （mol L^{-1}）	Cd	Pb	Zn
0	0.0063±0.0016	0.8092±0.2581	0.4698±0.1685
0.1	0.0084±0.0041	0.9549±0.1542	0.5561±0.0063
0.5	0.0090±0.0002	0.1257±0.0257	0.9787±0.2409
1	0.0120±0.0015	0.0868±0.0209	0.7453±0.1164
1.5	0.0170±0.0004	0.0949±0.0337	0.8705±0.2002

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Fruit name	Statistical value	Cd	Cr	Cu	Ni	Pb	Zn
Banana	Maximum value	0.004	0.003	1.282	0.031	0.008	1.413
	Minimum value	0.000	0.002	0.859	0.009	0.001	0.786
	Mean value	0.002	0.003	1.042	0.018	0.004	1.039
	Standard deviation	0.001	0.000	0.154	0.009	0.003	0.247
	BCF max（×103）	0.046	0.001	1.469	0.042	0.006	0.241
	BCF min（×103）	0.000	0.000	0.984	0.012	0.006	0.133
peach	Maximum value	0.029	0.047	0.524	0.043	0.005	1.107
	Minimum value	0.004	0.000	0.197	0.023	0.000	0.527
	Mean value	0.020	0.007	0.377	0.033	0.002	0.780
	Standard deviation	0.009	0.013	0.094	0.006	0.002	0.181
	BCF max（×103）	0.340	0.010	0.601	0.058	0.004	0.189
	BCF min（×103）	0.051	0.000	0.226	0.031	0.000	0.090
loquat	Maximum value	0.304	0.099	0.675	0.160	0.047	0.875
	Minimum value	0.003	0.000	0.132	0.003	0.000	0.304
	Mean value	0.093	0.008	0.425	0.046	0.003	0.523
	Standard deviation	0.058	0.012	0.114	0.031	0.006	0.121
	BCF max（×103）	3.539	0.021	0.773	0.215	0.038	0.149
	BCF min（×103）	0.038	0.000	0.152	0.004	0.000	0.052
Mango	Maximum value	0.046	0.024	1.287	0.033	0.038	1.171
	Minimum value	0.001	0.000	0.181	0.000	0.000	0.214
	Mean value	0.010	0.006	0.475	0.011	0.007	0.469
	Standard deviation	0.010	0.006	0.245	0.009	0.009	0.221
	BCF max（×103）	0.533	0.005	1.474	0.044	0.031	0.199
	BCF min（×103）	0.012	0.000	0.207	0.000	0.000	0.036
Food safety National standard GB 2762-2022	Banana	0.050	——	——	——	0.100	——
	peach	0.050	——	——	——	0.100	——
	loquat	0.050	——	——	——	0.100	——
	Mango	0.050	——	——	——	0.100	——

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Tables S7Fruit heavy metal content (mg/kg)

index	content
pH	7.72±0.04
Organic matter(g/kg)	40.29±2.58
Alkali-hydrolyzed nitrogen(mg/Kg)	185.50±10.51
Available phosphorus(mg/Kg)	25.17±0.27
Rapidly available potassium(mg/Kg)	180.06±1.96
Cation exchange capacity(cmol/Kg)	13.74±0.11

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Table S8 Basic physical and chemical properties of soil

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32   Figure S1: The scene map of the research area.
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