**Supplementary Material**

**Mineralogical and geochemical characteristics of barium slag and ecological risks associated with heavy metals**

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**Table S1.** Statistics of BS screening results.

|  |  |
| --- | --- |
| Number | wt (%) |
| BS1 | 52.55 |
| BS2 | 13.52 |
| BS3 | 13.10 |
| BS4 | 9.330 |
| BS5 | 11.50 |
| Total | 100.0 |

**Table S2.** Chemical composition distribution (wt%) in BS with different particle size.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Chemical compositions | ≥850 μm  (BS1) | 425-850 μm  (BS2) | 150-425 μm  (BS3) | 75-150 μm  (BS4) | ＜75 μm  (BS5) | Total |
| SiO2  BaO  SO3  CaO  Al2O3  Fe2O3  MgO  Na2O  K2O  TiO2  P2O5  SrO  V2O5  ZnO  MnO | 50.84  48.69  45.75  54.93  52.77  50.74  52.08  40.97  56.16  51.36  61.63  51.30  56.29  50.41  51.07 | 14.62  12.73  12.29  13.69  14.30  11.02  13.28  14.74  14.70  14.25  13.84  12.72  14.11  10.68  14.55 | 13.34  12.90  12.75  11.65  15.04  11.20  13.93  17.45  12.55  15.43  11.05  12.79  9.120  12.00  13.19 | 7.020  11.09  12.87  7.730  9.140  9.490  10.42  12.21  7.340  8.990  5.680  9.500  7.260  10.27  8.420 | 6.620  14.60  16.36  12.00  8.750  17.54  10.29  14.63  9.250  9.980  7.800  13.69  13.22  16.64  12.77 | 100.0  100.0  100.0  100.0  100.0  100.0  100.0  100.0  100.0  100.0  100.0  100.0  100.0  100.0  100.0 |

**Table S3.** Heavy metal distribution (%) in BS with different particle size.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Heavy  metal | ≥850 μm  (BS1) | 425-850 μm  (BS2) | 150-425 μm  (BS3) | 75-150 μm  (BS4) | ＜75 μm  (BS5) | Total |
| Cu  Zn  Pb  Cr  Cd  Ni  Fe  Mn  As  Ba | 50.44  49.85  59.68  51.52  52.08  56.64  51.04  52.24  51.61  45.39 | 10.97  11.71  14.06  12.11  12.15  13.10  10.99  12.98  11.25  11.48 | 11.39  12.55  8.270  12.16  11.77  13.67  11.07  12.31  10.62  15.44 | 10.15  10.20  6.830  9.010  9.520  11.17  9.650  9.110  9.840  12.30 | 17.05  15.69  11.16  15.20  14.49  5.430  17.25  13.35  16.69  15.40 | 100.0  100.0  100.0  100.0  100.0  100.0  100.0  100.0  100.0  100.0 |

|  |
| --- |
| BS1元素组合 |
| **Fig.S1.** Representative elemental mappings (C, O, Al, Si, S, Ca, Cr, Mn, Fe, Ni, Cu, Zn, As, Cd, Ba and Pb) of the BS1. |
| BS2元素组合 |
| **Fig.S2.** Representative elemental mappings (C, O, Al, Si, S, Ca, Cr, Mn, Fe, Ni, Cu, Zn, As, Cd, Ba and Pb) of the BS2. |
| BS3元素组合 |
| **Fig.S3.** Representative elemental mappings (C, O, Al, Si, S, Ca, Cr, Mn, Fe, Ni, Cu, Zn, As, Cd, Ba and Pb) of the BS3. |
| BS4元素组合 |
| **Fig.S4.** Representative elemental mappings (C, O, Al, Si, S, Ca, Cr, Mn, Fe, Ni, Cu, Zn, As, Cd, Ba and Pb) of the BS4. |
| BS5元素组合 |
| **Fig.S5.** Representative elemental mappings (C, O, Al, Si, S, Ca, Cr, Mn, Fe, Ni, Cu, Zn, As, Cd, Ba and Pb) of the BS5. |