**Table S1** The sample size and collection phase of industrial wastewater

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Industrial Category** | **CMP\*** | **BPCB1** | **EP1** | **BPCB2** | **FM** | **FT** | **MST** | **EP2** | **DS** | **BPCB1m** | **EP1m** | **BPCB2m** |
| Collection Phase | II | I, II | I, II | I, II | I, II | I, II | I | II | II | I, II | I, II | I, II |
| Sample size | 1 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 2 | 2 | 2 |

\*CMP = chemical materials and products; BPCB = bare printed circuit boards; EP = electroplating products; FM = food manufacturing; FT = finishing of textiles; MST = metal surface treatment; DS = domestic sewage. Three manufacturing unit collected from BPCP1, EP1 and BPCP2 are with “m” in front of the category.

**Table S2** Mean concentrations, standard deviation, MDL and BDL of 52 elements in the river water samples

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Mean** | **Std** | **MDL\*** | **BDL** | **Species** | **Mean** | **Std** | **MDL** | **BDL** |
| **(μg L-1)** | **(μg L-1)** | **(μg L-1)** | **(%)** | **(μg L-1)** | **(μg L-1)** | **(μg L-1)** | **(%)** |
| **Silver**  | 0.59 | 1.00 | 0.03 | 1.67 | **Niobium** | 0.10 | 0.09 | 0.03 | 11.67 |
| **Aluminum**  | 1165.94 | 2279.17 | 1.67 | 0.00 | **Neodymium** | 0.20 | 0.47 | 0.03 | 11.67 |
| **Arsenic**  | 5.63 | 24.98 | 0.03 | 0.00 | **Nickel** | 313.44 | 281.25 | 0.03 | 0.00 |
| **Gold**  | 0.31 | 0.46 | 0.03 | 1.67 | **Lead** | 7.52 | 13.35 | 0.03 | 0.00 |
| **Boron**  | 135.74 | 50.78 | 0.33 | 0.00 | **Palladium** | 0.05 | 0.09 | 0.03 | 61.67 |
| **Barium**  | 84.85 | 66.34 | 0.03 | 0.00 | **Praseodymium** | 0.05 | 0.11 | 0.03 | 70.00 |
| **Cadmium** | 3.13 | 23.66 | 0.03 | 21.67 | **Platinum** | 0.00 | 0.00 | 0.03 | 100.00 |
| **Cerium** | 0.54 | 1.00 | 0.03 | 0.00 | **Rubidium** | 7.44 | 1.93 | 0.03 | 0.00 |
| **Cobalt** | 10.63 | 9.02 | 0.03 | 0.00 | **Ruthenium** | 0.00 | 0.00 | 0.03 | 100.00 |
| **Chromium** | 87.84 | 128.02 | 0.03 | 0.00 | **Antimony** | 7.27 | 5.33 | 0.03 | 0.00 |
| **Caesium** | 0.15 | 0.18 | 0.03 | 0.00 | **Selenium** | 0.21 | 0.17 | 0.17 | 45.00 |
| **Copper** | 1245.76 | 1200.00 | 0.03 | 0.00 | **Samarium** | 0.04 | 0.10 | 0.03 | 73.33 |
| **Dysprosium** | 0.04 | 0.07 | 0.03 | 76.67 | **Tin** | 62.49 | 113.02 | 0.03 | 0.00 |
| **Erbium** | 0.02 | 0.03 | 0.03 | 91.67 | **Strontium** | 171.04 | 28.48 | 0.03 | 0.00 |
| **Europium** | 0.01 | 0.02 | 0.03 | 93.33 | **Tantalum** | 0.05 | 0.03 | 0.03 | 30.00 |
| **Iron** | 2261.06 | 2298.52 | 0.17 | 0.00 | **Tellurium** | 0.00 | 0.00 | 0.03 | 100.00 |
| **Gallium** | 2.92 | 19.90 | 0.03 | 0.00 | **Thorium** | 0.07 | 0.12 | 0.03 | 48.33 |
| **Gadolinium** | 0.06 | 0.10 | 0.03 | 48.33 | **Titanium** | 8.14 | 17.39 | 0.17 | 0.00 |
| **Hafnium** | 0.01 | 0.01 | 0.03 | 95.00 | **Thallium** | 0.04 | 0.04 | 0.03 | 60.00 |
| **Mercury** | 0.08 | 0.07 | 0.03 | 13.33 | **Thulium** | 0.00 | 0.00 | 0.03 | 100.00 |
| **Holmium** | 0.01 | 0.01 | 0.03 | 96.67 | **Uranium** | 0.08 | 0.09 | 0.03 | 6.67 |
| **Indium** | 0.32 | 0.55 | 0.03 | 3.33 | **Vanadium** | 1.44 | 1.84 | 0.03 | 0.00 |
| **Iridium** | 0.00 | 0.00 | 0.03 | 100.00 | **Tungsten** | 26.82 | 45.71 | 0.17 | 0.00 |
| **Lanthanum** | 0.30 | 0.59 | 0.03 | 0.00 | **Ytterbium** | 0.02 | 0.03 | 0.03 | 93.33 |
| **Manganese** | 273.11 | 116.04 | 0.03 | 0.00 | **Zinc** | 558.49 | 594.72 | 0.17 | 0.00 |
| **Molybdenum** | 3.53 | 1.85 | 0.03 | 0.00 | **Zirconium** | 0.23 | 0.30 | 0.67 | 91.67 |

\*MDL = method detection limit; BDL = below detection limit.

**Table S3** Two pollution indices, namely MI and total elemental concentrations, for eight sampling sites

|  |  |  |  |
| --- | --- | --- | --- |
| **Site Code** | **Metal Index (MI)** | **The total elemental concentration (μg L-1)** | **The total elemental concentration without Al and Fe (μg L-1)** |
| S1 | 11.3 | 2289.45 | 1348.55 |
| S2 | 37.8 | 3722.51 | 1715.89 |
| S3 | 7.4 | 1694.94 | 881.87 |
| S4 | 42.8 | 6201.61 | 3598.50 |
| S5 | 4.5 | 1455.72 | 633.21 |
| S6 | 3.6 | 4273.21 | 607.37 |
| S7 | 5.3 | 1730.36 | 1095.63 |
| S8 | 2.5 | 966.65 | 605.33 |

**Table S4** Bootstrapping results for three to eight factors

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **3 Factors** | **4 Factors** | **5 Factors** | **6 Factors** | **7 Factors** | **8 Factors** |
| **Boot Factor 1** | 99 | 82 | 92 | 98 | 98 | 100 |
| **Boot Factor 2** | 100 | 98 | 100 | 77 | 98 | 69 |
| **Boot Factor 3** | 74 | 67 | 88 | 100 | 100 | 94 |
| **Boot Factor 4** | - | 100 | 95 | 94 | 94 | 76 |
| **Boot Factor 5** | - | - | 91 | 98 | 98 | 99 |
| **Boot Factor 6** | - | - | - | 97 | 65 | 100 |
| **Boot Factor 7** | - | - | - | - | 98 | 100 |
| **Boot Factor 8** | - | - | - | - | - | 98 |



**Fig. S1.** A fishbone diagram of the sampling locations in the Ta-Liao-Keng River.



**Fig. S2.** Maximum individual column mean (IM) and maximum individual column standard deviation (IS) for three to eight factors.



**Fig. S3.** Monitored concentrations of Cu and the contributions to Cu of Factors 1 and 4 at S4.

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**Fig. S4.** The source profiles of Factors 1, 4, and 5.