**Supplementary Information**

An integrated and efficient process for borax preparation and magnetite recovery from soda-ash roasted ludwigite ore under CO–CO2–N2 atmosphere

Jinxiang You1), Jing Wang1), Mingjun Rao1),🖂, Xin Zhang1), Jun Luo2), Zhiwei Peng1), and Guanghui Li1),🖂

1) School of Minerals Processing and Bioengineering, Central South University, Changsha 410083, China

2) College of Chemistry and Chemical Engineering, Central South University, Changsha 410083, China

**Table S1**

**Table S1. Particle size distribution of the grinding products under different grinding time**

|  |  |
| --- | --- |
| Grinding time / min | Yield / % |
| +0.038 mm | −0.038 mm |
| 3 | 23.00 | 77.00 |
| 5 | 13.10 | 86.90 |
| 10 | 3.75 | 96.25 |
| 15 | 1.23 | 98.77 |
| 20 | 0.14 | 99.86 |
| 25 | 0.00 | 100.00 |

As shown in Table S1, the mass proportion of particles smaller than 0.038 mm increased with increasing grinding time. Specifically, the percentage of grinding products with a particle size smaller than 0.038 mm increased from 77.00% to 99.86% when the grinding time was extended from 3 to 20 minutes. The prolonged grinding time was found to support mineral dissociation.

**Figure S1**



**Fig. S1. Effect of grind-leaching time on the boron/iron separation indexes.**

Fig. S1 illustrates that boron leaching efficiency increased from 70.50% to 93.27% as the grind-leaching time increased from 2 to 25 min and reached a plateau at 20 min.