**Preferentially selective extraction of lithium from spent LiCoO2 cathodes by medium-temperature carbon reduction roasting**

*Daixiang Wei*1, *Wei Wang*2),🖂, *Longjin Jiang*3), *Zhidong Chang*1),🖂, *Hualei Zhou*1), *Bin Dong*1), *Dekun Gao*4), *Minghui Zhang*1), *and Chaofan Wu*1)

1) School of Chemistry and Biological Engineering, University of Science and Technology Beijing, Beijing 100083, China

2) State Key Laboratory of Biochemical Engineering, Institute of Process Engineering, Chinese Academy of Sciences, Beijing 100190, China

3) Anhui Chaoyue Environmental Protection Technology Co., Ltd, Chuzhou 239060, China

4) Anhui Huihong Technology Co., Ltd, Chuzhou 239060, China

(Received: 27 February 2023; revised: 25 June 2023; accepted: 28 June 2023)

Corresponding authors: Zhidong Chang E-mail: zdchang@ustb.edu.cn; Wei Wang E-mail: weiwang@ipe.ac.cn

**Table S1. Chemical compositions of LCO**  wt %

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Li | Ni | Co | Mn | Others |
| 7.34 | 0.45 | 53.15 | 0.06 | 39.00 |

**Table S2. Li content in water-leaching residue**

|  |  |
| --- | --- |
| Temperature / °C | Lithium / wt% |
| 650 | 0.94 |
| 700 | 2.65 |
| 750 | 5.26 |
| 800 | 6.39 |



**Fig. S1. EPR of spent LCO and roasted product.**

**Table S3. Lithium recovery rate of ICP-OES results**

|  |  |
| --- | --- |
| Content | Lithium recovery rate / % |
| No.1 | 98.91 |
| No.2 | 99.89 |
| No.3 | 99.94 |
| Average | 99.58 |



**Fig. S2. XRD patterns of roasted sample at 650°C for 60 min with the mass ratio of 1:0.15.**