

Supporting Information

Aqueous leaching of lithium from simulated pyrometallurgical slag by sodium sulfate roasting

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The concentration of Lithium was measured by the atomic absorption spectrophotometer (AAS, AA 6800, Shimadzu, Japan) at the wavelength of 670.8 nm with a current of 8 mA. 2.0 g of the roasted product was leached by water in the batch experiment.

Table S1. Lithium concentration (ppm) in leaching solution (roasting time of 60 min was fixed, and leaching conditions are fixed as follows: liquid to solid (L/S) mass ratio of 20:1, leaching temperature of 25°C and leaching time of 60 min).

	500°C	550°C	600°C	650°C	700°C	750°C	800°C	850°C	900°C
1:1	32.31	37.95	74.93	239.65	346.02	549.38	702.02	294.42	137.40
2:1	26.80	35.50	79.96	196.13	308.93	492.73	638.33	336.74	174.72
3:1	27.48	37.55	70.87	186.27	269.49	466.09	632.41	318.53	193.96
4:1	23.89	26.04	61.52	203.12	246.61	404.48	534.71	293.32	185.53

Table S2. Lithium concentration (ppm) in leaching solution (molar ratio of Na₂SO₄/Li (3:1) was fixed, and leaching conditions are fixed as follows: liquid to solid (L/S) mass ratio of 20:1, leaching temperature of 25°C and leaching time of 60 min).

	20min	40min	60min	80min	100min	120min
750°C	345.50	375.54	466.09	262.88	225.32	172.75
800°C	458.19	506.13	632.41	409.68	355.70	280.51
850°C	157.73	262.88	318.53	195.28	180.26	142.71

Table S3. Lithium concentration (ppm) in leaching solution (the L/S mass ratio of 20:1, leaching time of 60 min

and roasting conditions ($\text{Na}_2\text{SO}_4/\text{Li}$ molar ratio of 3:1, roasting temperature of 800°C for 60 min) are fixed.

T($^\circ\text{C}$)	30	40	50	60	70	80	90
C(ppm)	637.43	640.43	649.09	664.33	682.66	682.73	681.23

Table S4. Lithium concentration (ppm) in leaching solution (the L/S mass ratio of 20:1, leaching temperature of 70°C and roasting conditions ($\text{Na}_2\text{SO}_4/\text{Li}$ molar ratio of 3:1, roasting temperature of 800°C for 60 min) are fixed.

t (min)	20	40	60	80	100	120
C(ppm)	647.72	659.82	682.66	690.92	687.99	689.49

Table S5. Lithium concentration (ppm) in leaching solution (the leaching temperature of 70°C , leaching time of 80 min and roasting conditions ($\text{Na}_2\text{SO}_4/\text{Li}$ molar ratio of 3:1, roasting temperature of 800°C for 60 min) are fixed.

L/S	10	20	30	40	50
C(ppm)	641.35	690.85	703.16	703.84	703.0