ELECTRONIC SUPPLEMENTARY INFORMATION

Preliminary Challenges in Upscaling the Recovery of Lithium from Spent Lithium-ion Batteries by Electrochemical Method: A Review

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Table S1. Preliminary economic analysis for recovery of one-ton scrap $LiMn_2O_4$ by slurry electrolysis. [1]

Revenue	Products	Mass (kg)	Price (USD/kg)	Benefits ($)
	Li_2CO_3	92.74	12.00	1112.88
	MnO_2	441.42	2.20	971.12
	$Na_2SO_4 \cdot 10H_2O$	1965.00	0.09	176.85
	Total	-		**2260.85**
Energy cost	**Procedure**	**Energy consumption (kWh)**	**Price (USD*kWh)**	**Cost ($)**
	Slurry electrolysis	1173.33	0.15	-176.00
	Filtering, drying and sieving	230	0.15	-34.50
	Evaporative crystallization	1100	0.15	-165.00
	Freeze crystallisation	110	0.15	-16.50
	Total	2613.33	0.15	**-392.00**
Reagent cost	**Reagents**	**Dosage (kg)**	**Price (USD/kg)**	**Cost ($)**
	NaOH	488.20	0.60	−292.92
	H_2SO4	598.05	0.25	−149.51
	Total			**-442.43**
Net profit				**1426.42**

Table S2. Preliminary economic analysis for recovery of one-ton scrap $LiMn_2O_4$ by various methods. [1]

Process	Reagent cost (USD)	Energy cost (USD)	Revenue	Profit	Reference
Pyrometallurgy	-	559.05	1687.14	1128.09	2
Hydrometallurgy	-	387.53	1237.78	850.25	3
Hydrometallurgy	659.28	415.5	1303.10	228.32	4
Electrochemical (slurry electrolysis)	442.43	392.00	2260.85	1426.42	1

Table S3. Economic analysis for recycling one ton of spent LiFePO4 batteries by the electrochemical method (suspension electrodialysis) in China (exchange rate: 1 USD = 6.72 CNY). [5]

Revenue	**Products**	**Mass (kg)**	**Price (USD/kg)**	**Benefits (USD)**
	$LiOH \cdot H_2O$	84.28	15.00[10]	1264.20
	$FePO_4$	302.45	1.00[11]	302.45
	Total	-		**1566.65**
Energy cost	**Procedure**	**Energy consumption (kWh)**	**Price (USD*kWh)**	**Cost (USD)**
	Suspension electrodialysis	1742.40	0.15	−261.36
	Filtering, drying and sieving	230.00	0.15	−34.50
	Evaporative crystallisation	802.67	0.15	−120.40
	Total	-		**−416.26**
Net profit				**1150.39**

Table S4. Preliminary economic analysis for recovery of one-ton spent LFP batteries in various methods. [5]

Products	**Reagent cost (USD)**	**Energy cost (USD)**	**Revenue (USD)**	**Profit (USD)**	**References**
Li_2CO_3, $FePO_4$	275.70	219.00	1272.2	777.5	6
Li_2CO_3, $FePO_4$	274.22	106.50	1329.90	949.18	7
Li_3PO_4, $FeC_2O_4.2H_2O$	858.00	77.88	1901.13	965.25	8
$LiOH \cdot H_2O$, $FePO_4$	-	416.26	1566.65	1150.39	5

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