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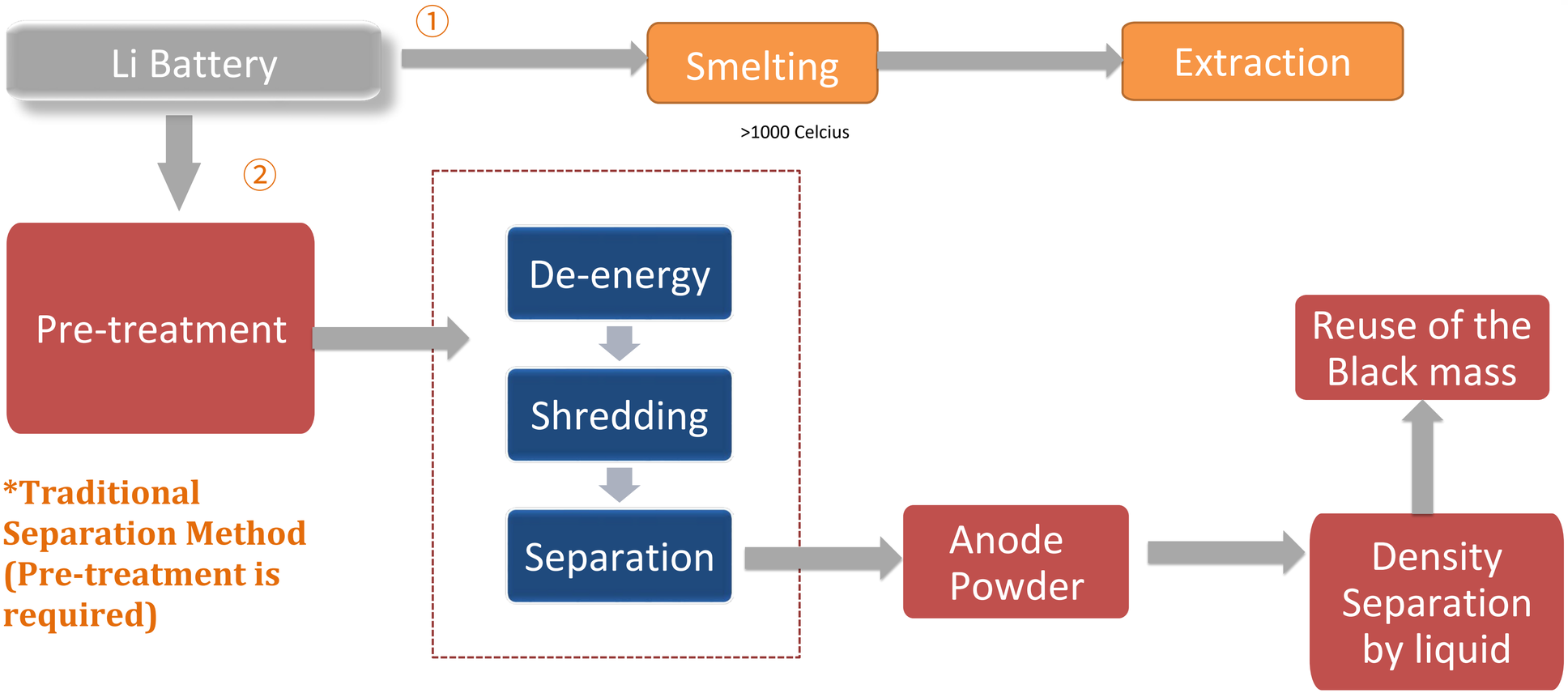
Lithium-Ion Battery Recycling Solution

Traditional Li Battery Recycle Process

To achieve the separation of Anode material, Black mass material, and casings, the battery will need pre-treatment before separation. There are mainly two processes to recycle the material： 1）Smelting 2）Granulation & Separation



Disadvantages of Pre-treatment Process

Disadvantages

Space take-up and long duration during energy releasing

Frequent changes, high labor cost and low efficiency

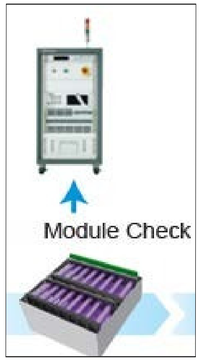
Salt water requires treatment

Salt water penetration into the cell, destroying the component

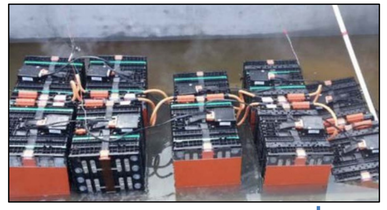
Energy cannot be fully released after the process

Methods of Energy Releasing

1.De-Energy with Load



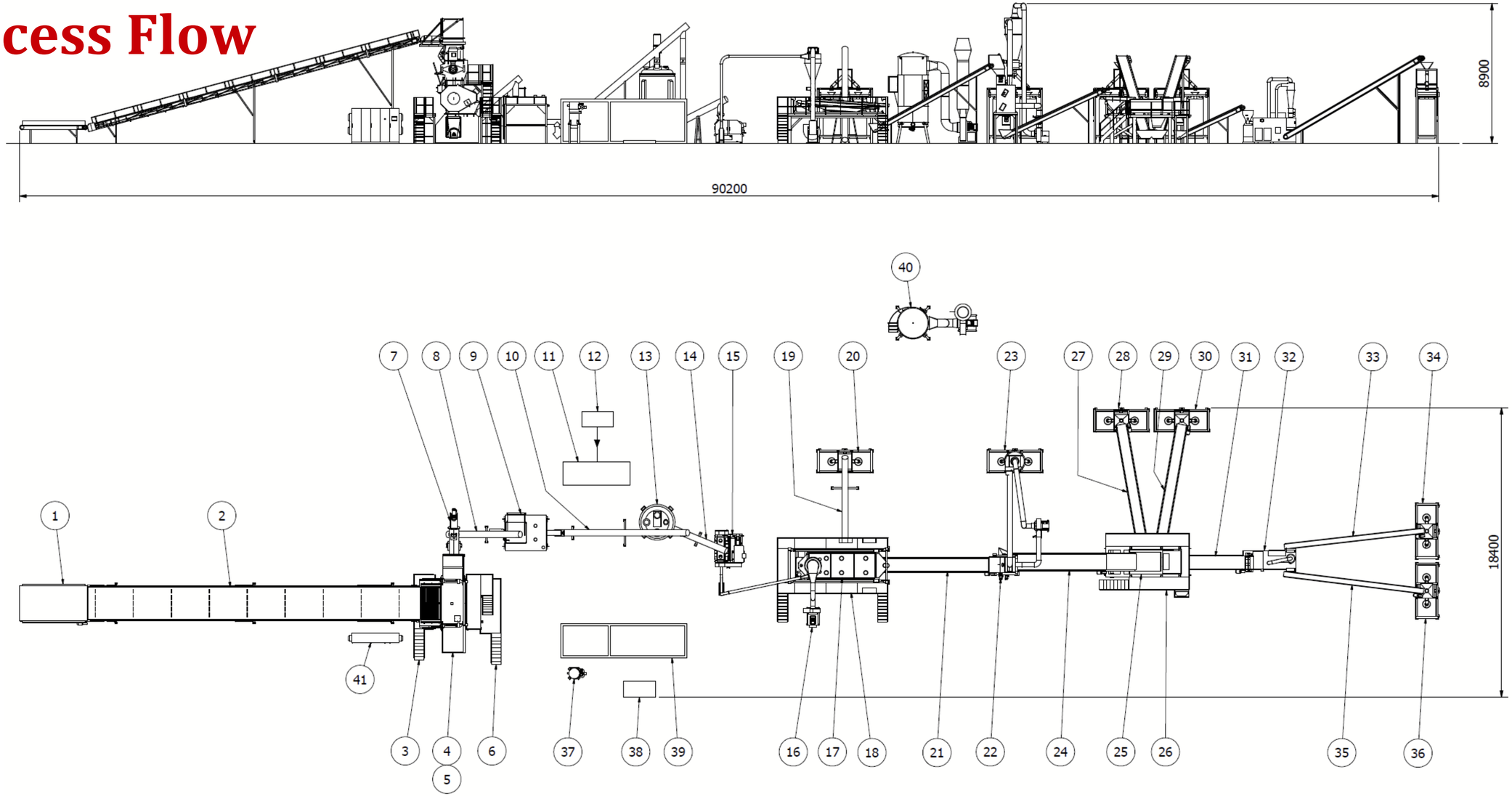
2.De-Energy with Salt Water



Energy cannot be fully Released

Shredding System

Process Flow



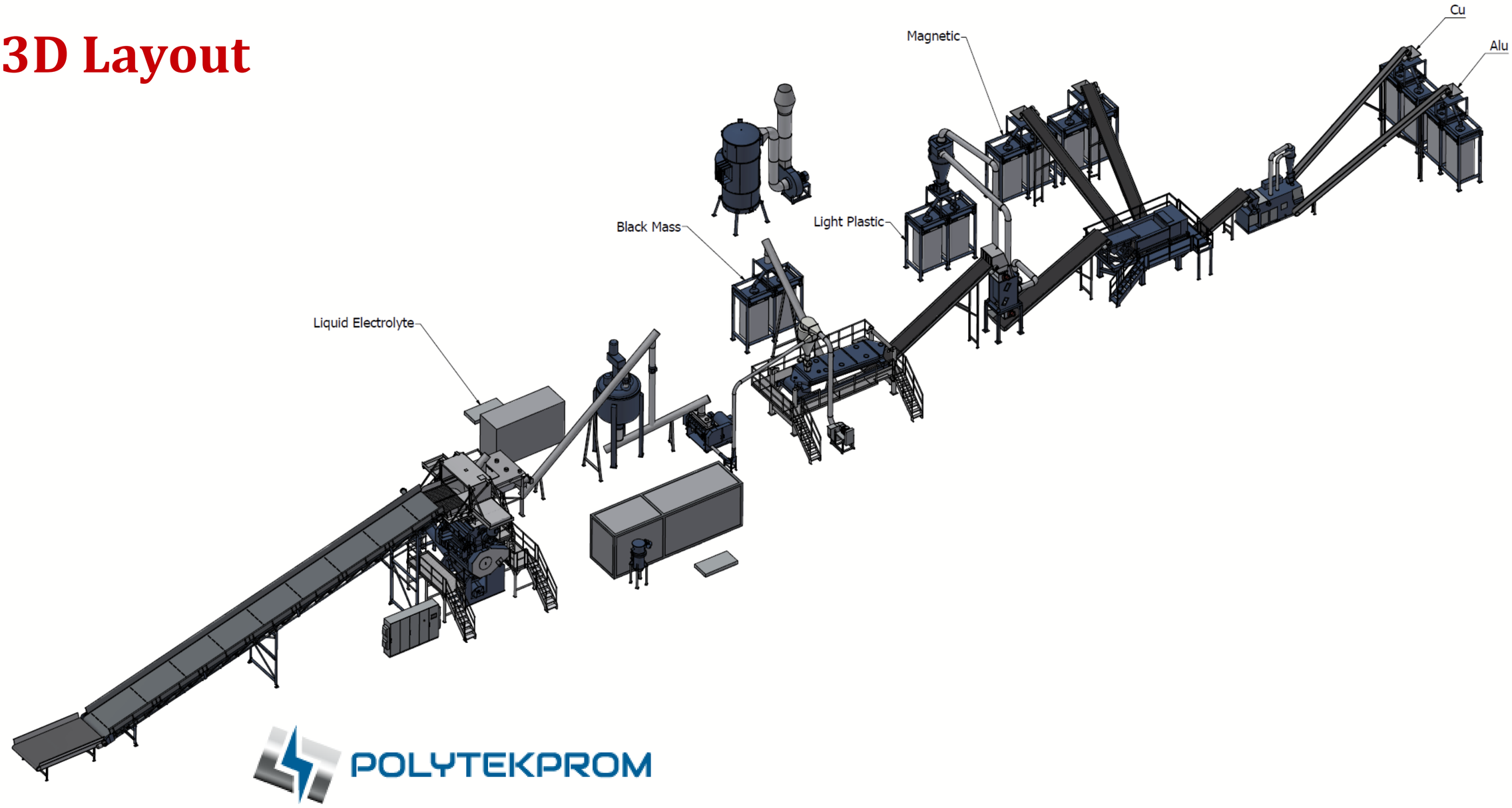
Lithium Ion Battery Recycling Process Flow

Item No	Description	Qty	Power (kW)
1	Horizontal Conveyor	1	4
2	Conveyor	1	7,5
3	Service Platform	1	
4	Shredder with Pusher	1	163,5
5	Grinder 200	1	264
6	Service Platform	1	
7	Screw Conveyor	1	5,5
8	Screw Conveyor	1	3,5
9	Buffering Silo	1	2,2
10	Screw Conveyor	1	3,5
11	Condenser	1	17,2
12	Scale		
13	Spiral Dryer	1	192
14	Screw Conveyor	1	3,5
15	Fine Grinder	1	110

16	Pneumatic Conveyor	1	20	24	Conveyor + magnet	1	2,2
17	Size Screener	1	4	25	Eddy Current Separator	1	7,1
18	Service Platform	1		26	Service Platform	1	
19	Screw Conveyor	1	3,5	27	Conveyor	1	1,5
20	Bagging Station	1		28	Bagging Station	1	
21	Conveyor	1	2,2	29	Conveyor	1	1,5
22	Zig Zag Separator	1	25,1	30	Bagging Station	1	
23	Bagging Station	1		31	Conveyor	1	2,2

32	Turbo Mill	1	40
33	Conveyor	1	1,1
34	Bagging Station	1	
35	Conveyor	1	1,1
36	Bagging Station	1	
37	Jet Filter 400 m3	1	
38	Scale	1	
39	Gas Removal Filter	1	4,5
40	Filter with Ventilator	1	25
41	Electric Cabinet	1	

3D Layout



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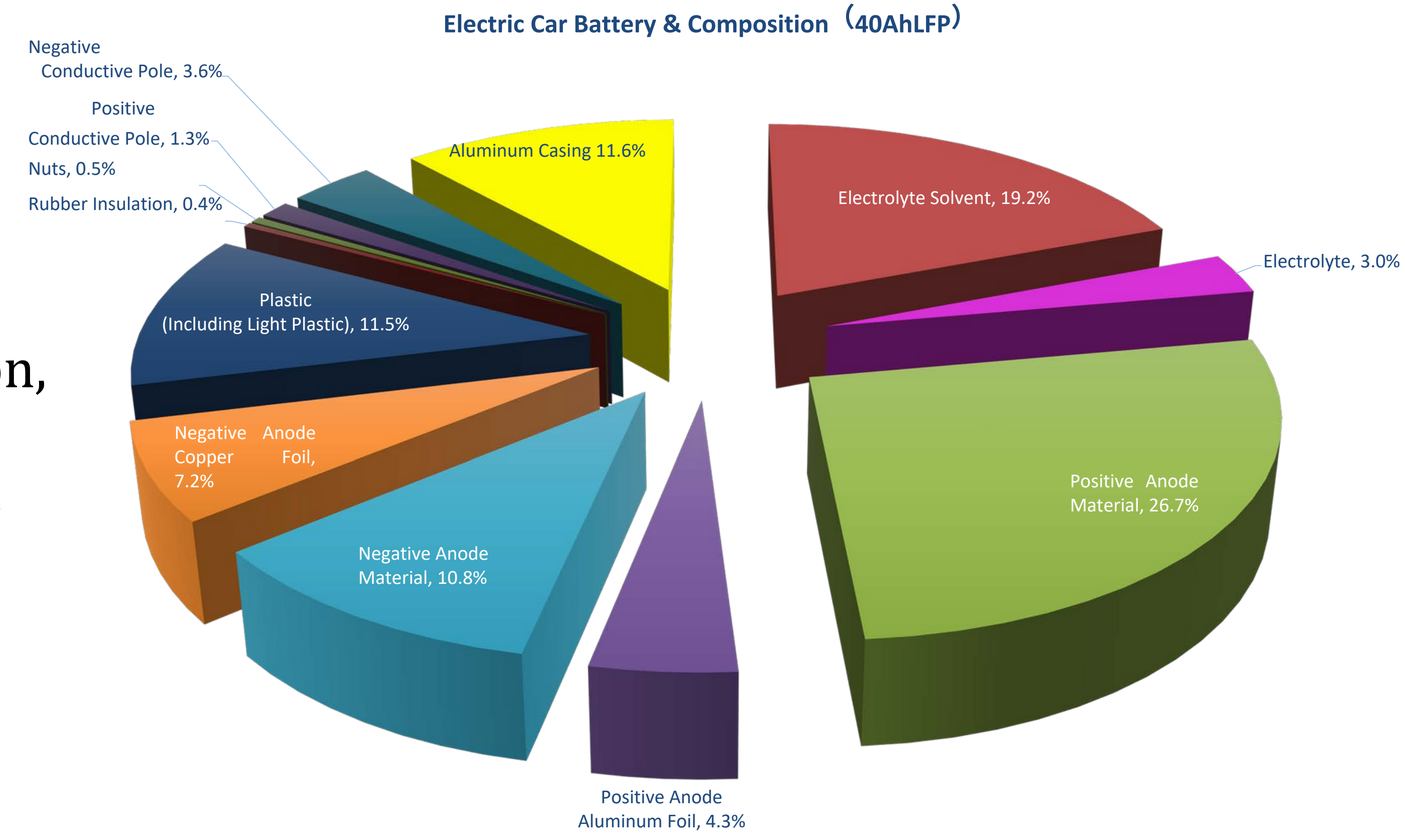
Advantages of Polytekprom's Solution

1. Shredding with Nitrogen
2. Efficient Electrolyte Recycling
3. Efficient Separation of Black Mass
4. Optional Process for Extraction of Material of all Types

Advantages of Polytekprom's Solution

Shredding without Releasing Energy

- Reduce energy releasing time and duration, solve the problem of salt water treatment
- Realize continuous production and reduce manufacturing cost



Shredding Process

Characteristic

Shredding without releasing energy → Control Carbonization of Light Plastic Cover → Black Mass Extraction under Dry Environment → Special Design for Separation of Copper and Aluminum

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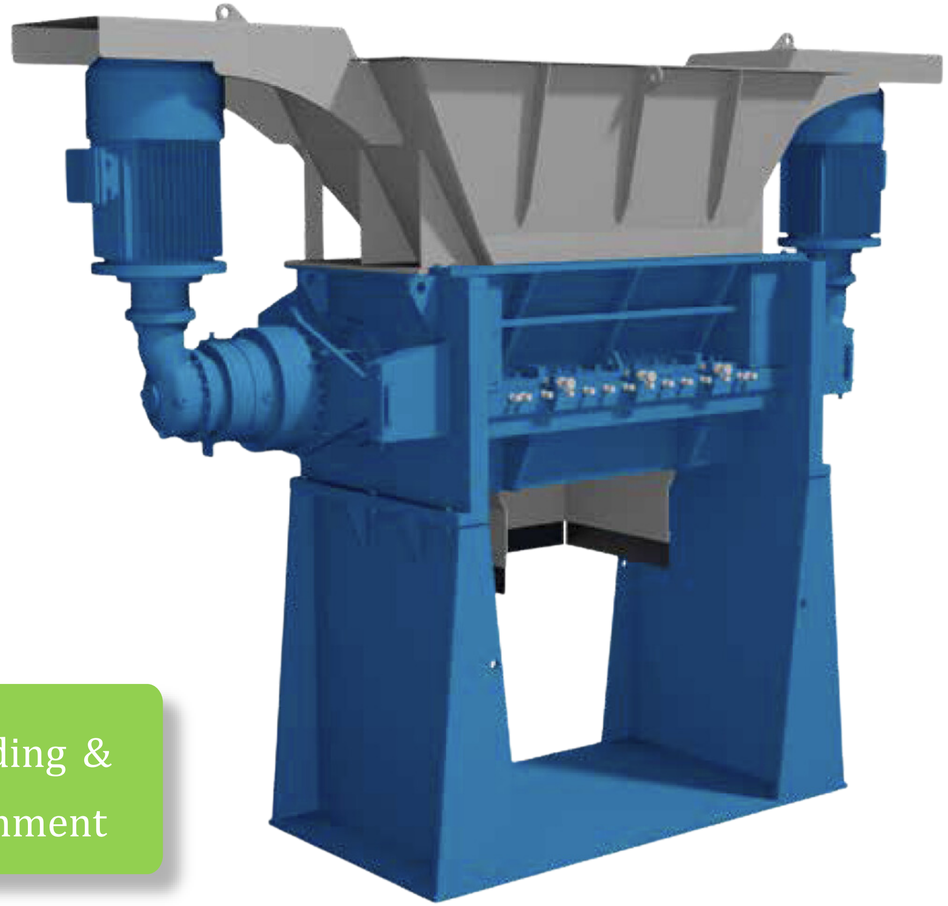


Oxygen Control Shredding & Vacuum Drying Environment

01 Equipped with Oxygen sensor for Nitrogen filling, safe airlocks for the hopper

02 Oxygen control to avoid the risk of fire and explosion

03 Double step shredding allow shredding big sized battery modules

Dryer & Condenser

Vertical Dryer & Condenser for Separating Electrolyte

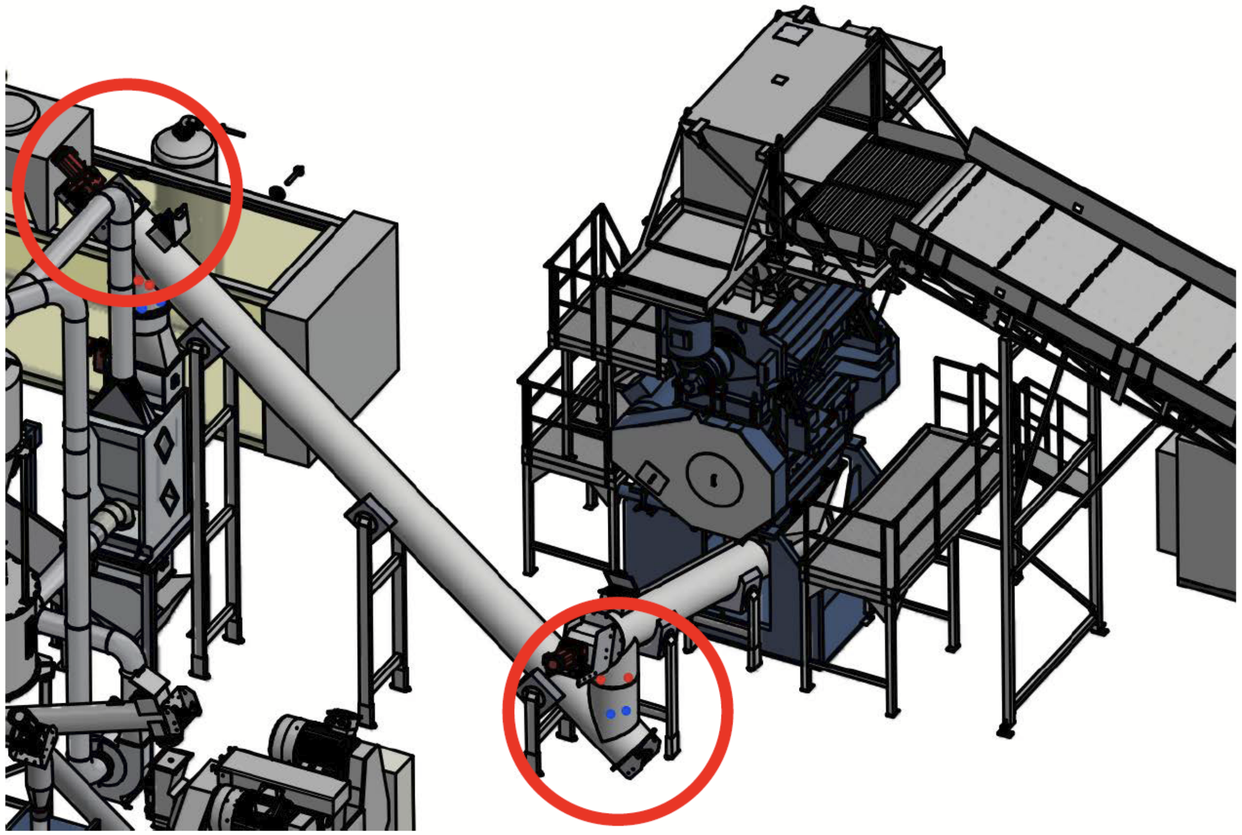
TechnicalAdvantages

01 Low energy consumption
app. 214 kW (dryer + condenser)

02 Vertical dryer with special agitator design to distribute thermal energy efficiently in the dryer.

03 Vacuum and condenser system sucks all the vapour from the dryer and condense the electrolyte into liquid form.

Spark Detection System



Detects the possible sparks in the system to protect the plant.

Fire extinquishing system is not included in this offer.

Line Details

Input Material: Used lithium-ion battery (electric vehicle battery modules, electronic device batteries etc.)

Maximum Input Size:
2200*1550*500 mm

Capacity: 500 kg/hour to 4t/hour

Product Quality: (depending on the composition of the input)
Black mass: ≥92%
Copper: ≤1.5%
Aluminum: ≤2.5%
Steel: ≤0.5%, others: ≤1%