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Long Time Tech. Co., Ltd.

Anode Materials for Li-ion Battery

Product : SiO/C

Product Name : LT-ZH-9X-450

Version : IA

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LT-ZH-9X-450 SiO/C

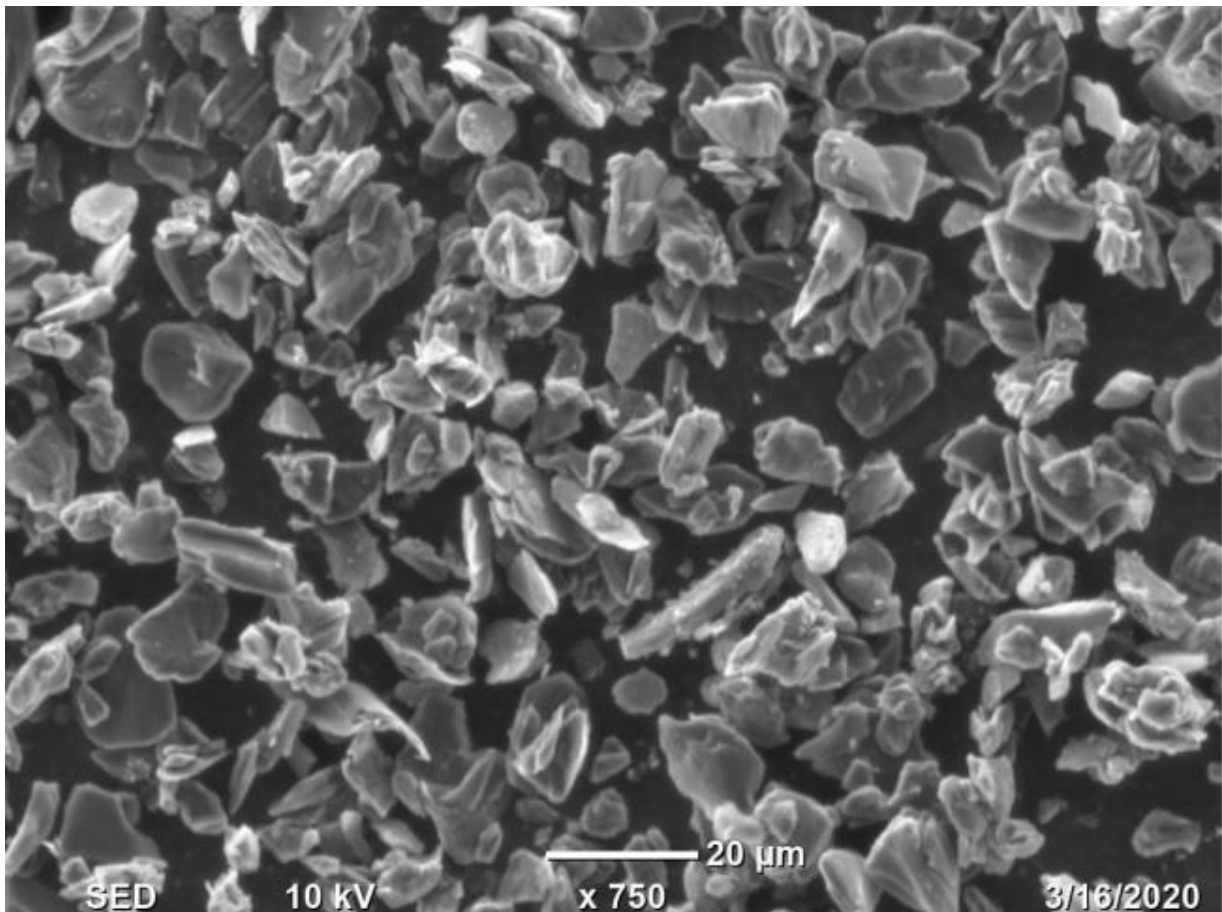
Specification

Item		Unit	Specification	Method
Particle Size	D ₁₀	μm	5 - 9	GB/T 24533-2009 App. A (0.2 ml 10% NP-40 solution was used to improve dispersion of graphite in water.)
	D ₅₀		11 - 15	
	D ₉₀		≤33	
Tap density		g/cm ³	≥ 0.95	GB/T 24533-2009 App. M
Specific surface area		m ² /g	≤ 2.0	GB/T 24533-2009 App. D
Moisture content		%	≤ 0.20	GB/T 3521-2008
1 st Discharge cap.		mAh/g	≥ 450	Half cell test (CR2032) in the range of 0.001 – 2 V at 0.1 C
1 st Coulombic eff.		%	≥ 88	

LT-ZH-9X-450 SiO/C

Features

- Stable and uniform material structure
- Stable cyclic performance
- Good battery safety
- Applied in:
Square and cylindrical battery

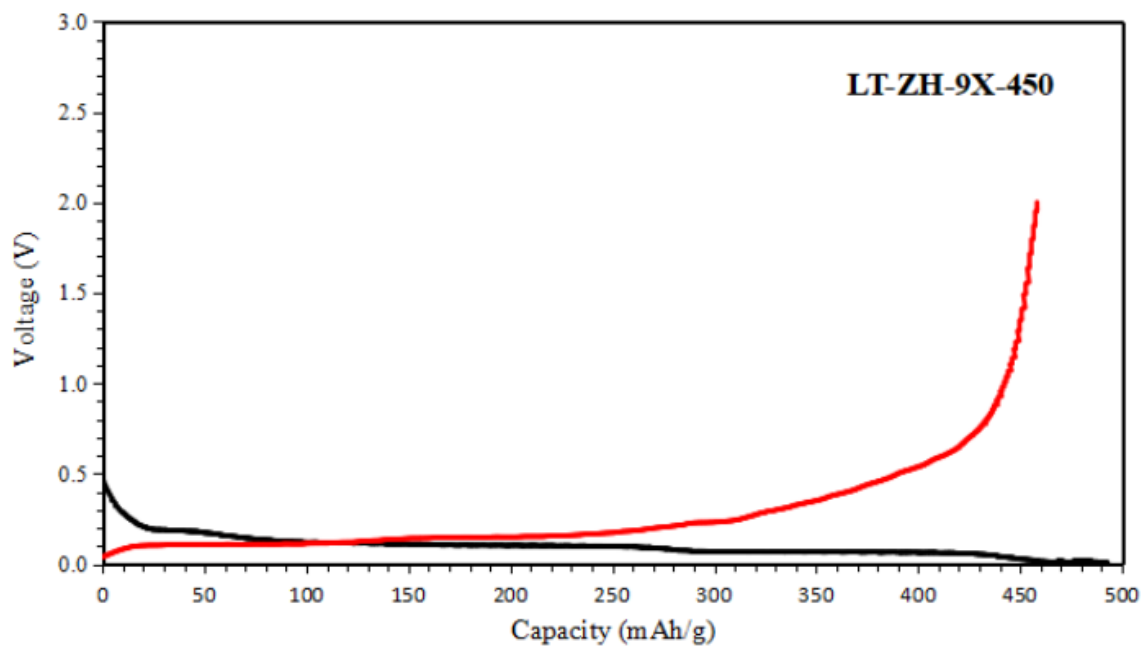


LT-ZH-9X-450 SiO/C (SEM)

LT-ZH-9X-450 SiO/C

Half cell test (CR2032)

Item							Remark
Components	1	Work electrode	Powder	Name	Chemicals	Ratio	—
				Active material	LT-ZH-9X-450	95.5%	—
				Conductive agent	Super P	1.0%	Timcal Super P
				Binder	CMC	1.5%	WEDAFR H631K
	SBR	2.0%	NIPPON A&L INC. SN-307R				
				Solvent	H ₂ O		—
		2	Counter electrode	Metallic lithium			—
		3	Electrolyte	1 M LiPF ₆ in EC: DMC: EMC(1:1:1 vol.%) with 1wt.% VC.			—
Testing	Rest Time			Current	Voltage		
	1	10 min		0.05 C	≤ 5 mV		
	2	10 min		200 μA	≤ 5 mV		
	3	5 min		50 μA	≤ 5 mV		
	4	5 min		0.10 C	≥ 2,000 mV		



Charge-Discharge Curves

LT-ZH-9X-450 SiO/C

Suggest preparation method of electrode for full cell

Item					Dose or Range	Unit	Remark	
0	Plan	Total weight of powder			1,000.0	g	—	
		Solid content of slurry (S/C)			47.1	%	—	
1	Materials	Powder	Name	Chemicals	Ratio	—	—	
			Active material	LT-ZH-9X-450	95.5%	955.0	g	—
			Conductive agent	Super P	1.0%	10.0	g	Timcal Super P
			Binder	CMC	1.5%	15.0	g	WEDAFR H631K (1%Vis.:1000-1200 mPas)
		SBR		2.0%	41.7	g	NIPPON A&L INC. SN-307R(S/C=48%)	
		Solvent		H ₂ O			1075.0	g
		NMP			25.0	g		
2	Slurry viscosity				2,500-4,000	cps	—	
3	Coated surface density		Single layer		80-100	g/m ²	—	
			Double layer		160-200	g/m ²		
4	Maximum electrode compacted density		Once		1.55	g/m ³		
			Twice		1.60	g/m ³		

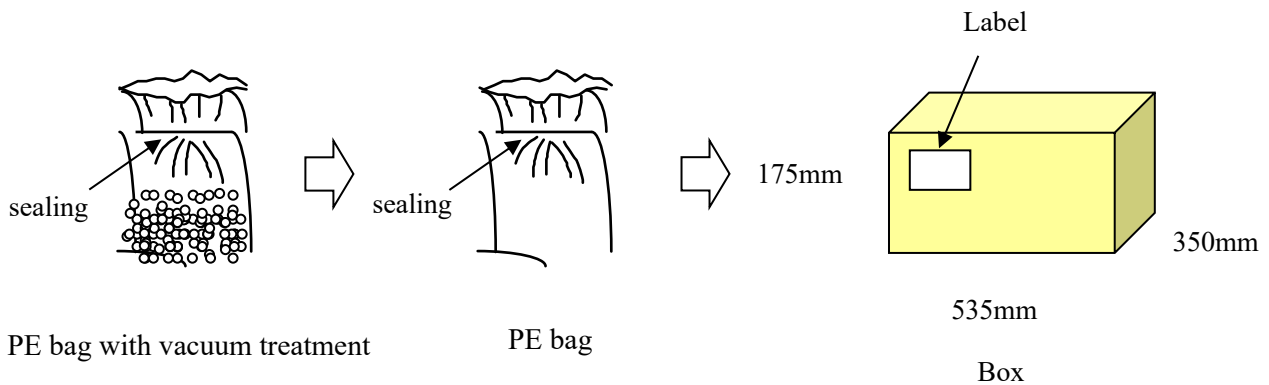
Methods

Order	Materials	Weight	Rotate	Revolution	Time	Slurry Temperature	Vacuum Treatment	Solid Content
		g	rpm	rpm	min	°C		%
1	Solvent—H ₂ O	225	-	-	-	20-30	Off	2.2
2	Binder—CMC	15	-	-	-	20-30	Off	
3	Solvent—H ₂ O	450	40	2,600	10	20-30	Off	
		-	60	3,600	120	20-30	On	
4	Conductive agent—Super P	10	40	2,600	10	20-30	Off	3.6
		-	60	3,600	60	20-30	On	
5	Active material— LT-ZH-9X-450	955	-	-	-	20-30	Off	50.1
6	Solvent—H ₂ O	300	40	260	10	20-30	Off	
		-	60	3,600	180	20-30	On	
7	Binder—SBR	41.7	-	-	-	20-30	Off	47.1
8	Solvent—NMP	25	-	-	-	20-30	Off	
9	Solvent—H ₂ O	100	40	2000	60	20-30	On	

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Packing

1. **Specifying:** 25 Kg/Box
2. **1st packing:** PE bag with vacuum treatment
3. **2nd packing:** PE bag
4. **3rd packing:** Paper box packing with label (including: Name, Lot No., MFD)



Storage Condition

- 1 Suggest storage temperature and humidity controlled below 40°C and 60%RH respectively, for brand new; After opening, please use it up as soon as possible.
- 2 After opening for 1 hour, it is a natural phenomenon for moisture regain, implying that moisture content of powder could be increased to 3000 ppm. Suggest drying it again before use.