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LHB-108P Hydrophilic Binder

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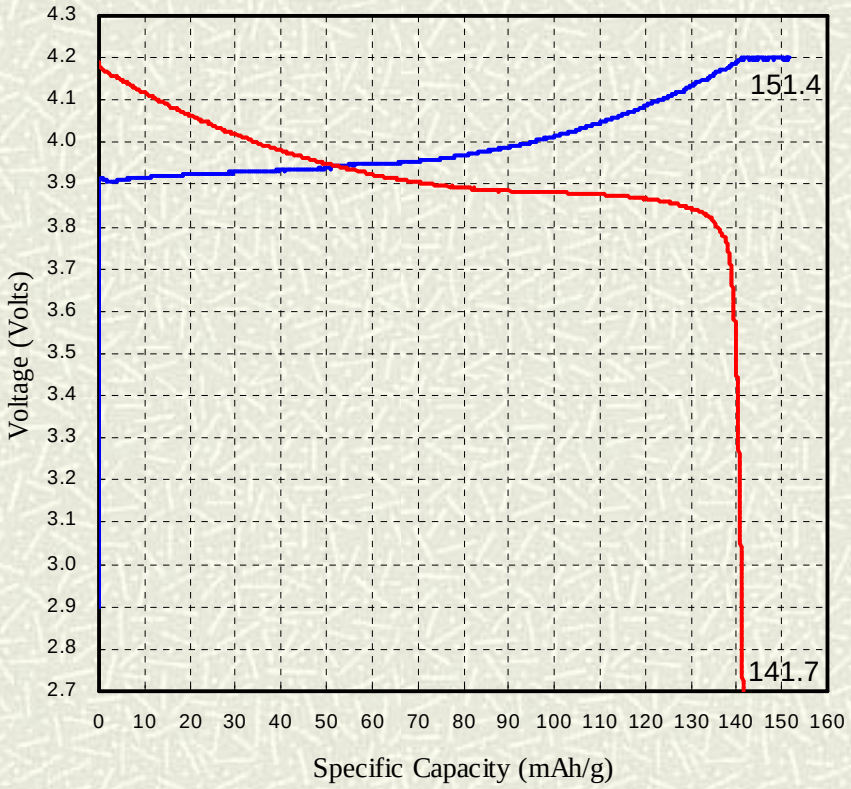
Hydrophilic Binder LHB-108P

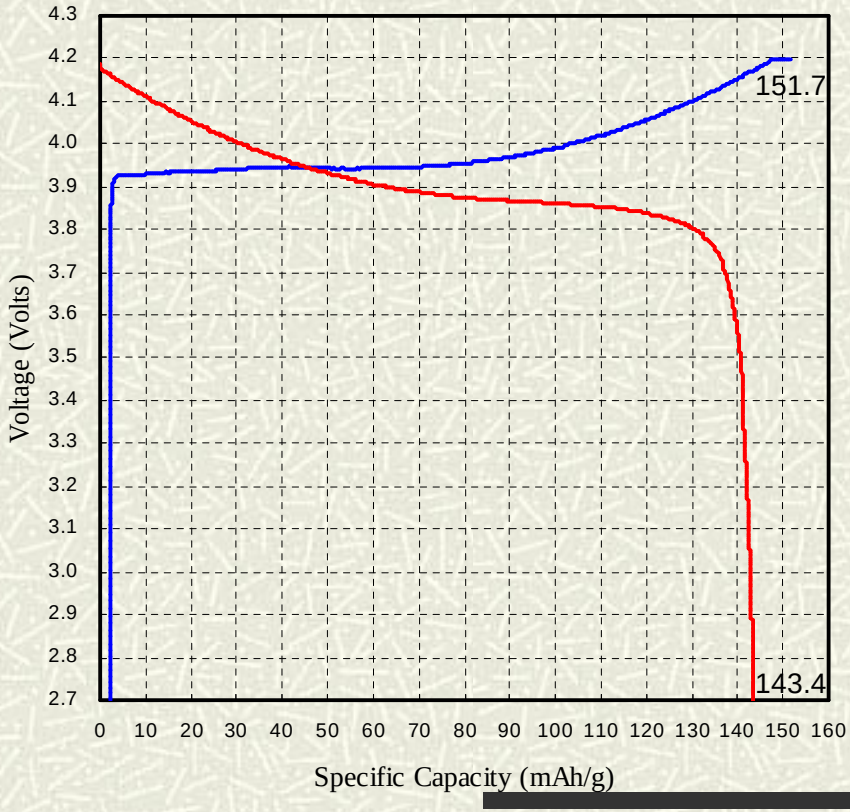
- **Use of water solvent – environmental friendliness**
- **Reduction of usage amount in slurry – only about 1.5% for cathode and 3.5% for anode needed**
- **No need of environment control in the slurry preparation**
- **Faster drying speed and lower drying temperature, promoting the electrode production rate by 1.5~2 times**
- **After the electrode fabrication, no dry room needed in the cell assembly processes**
- **Applicability for both the open and closed formation of lithium ion cells**
- **No detectable difference in the electrochemical property as compared to the PVDF binder.**

Electrochemical Properties for LHB-108P and Traditional PVDF

First Charge-Discharge Curves of a Cathode Made of LICO LHB-108P Hydrophilic Binder and LICO L106



First Charge-Discharge Curves of a Cathode Made of KF-1300 PVDF / NMP Binder and LICO L106



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Comparison of Formula Difference By Using PVDF and LHB-108P In Cathode

For 100 kg Total Solid Weight				
	Using PVDF		Using LHB-108P	
	$LiCoO_2$	$LiCoO_2$ 70% + $LiMn_2O_4$ 30%	$LiCoO_2$	$LiCoO_2$ 70% + $LiMn_2O_4$ 30%
Active Material	93 Kg	93 Kg	94.5 Kg	94.5 Kg
Conducting Carbon	4 Kg	4 Kg	4 Kg	4 Kg
Binder	3 Kg	3 Kg	1.5 Kg (10 Kg)	1.5 Kg (10 Kg)
Solvent	42.86 Kg	56.25 Kg	30.39 Kg	45.35 Kg
Solid-Content	70%	64%	72%	65%

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Comparison of Energy Density By Using PVDF and LHB-108P In Cathode

For 100 kg Total Solid Weight				
	Using PVDF		Using LHB-108P	
	$LiCoO_2$	$LiCoO_2$ 70% + $LiMn_2O_4$ 30%	$LiCoO_2$	$LiCoO_2$ 70% + $LiMn_2O_4$ 30%
Electrode Density	3.3 g/ml	3.3 g/ml	3.6 g/ml	3.6 g/ml
Specific Capacity	141 mAh/g	130 mAh/g (-7.8%)	141 mAh/g	130 mAh/g (-7.8%)
Usage Index of Material	1	1	1.015 (+1.5%)	1.015 (+1.5%)
Density Efficiency	1	1	1.09 (+9%)	1.09 (+9%)
Energy Density Efficiency	1	0.922 (-7.8%)	1.106 (+10.6%)	1.028 (+2.8%)

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Comparison of Cost Difference By Using PVDF and LHB-108P In Cathode

For 100 kg Total Solid Weight				
	Using PVDF		Using LHB-108P	
	$LiCoO_2$	$LiCoO_2$ 70% + $LiMn_2O_4$ 30%	$LiCoO_2$	$LiCoO_2$ 70% + $LiMn_2O_4$ 30%
Active Material	93 Kg	93 Kg	94.5 Kg	94.5 Kg
Conducting Carbon	4 Kg	4 Kg	4 Kg	4 Kg
Binder	3 Kg	3 Kg	1.5 Kg (10 Kg)	1.5 Kg (10 Kg)
Solvent	42.86 Kg	56.25 Kg	30.39 Kg	45.35 Kg
Solid-Content	70%	64%	72%	65%
Cost Formula	3´36.5+42.86´3.5	3´36.5+56.25´3.5	10´13.5+30.4´.45	10´13.5+45.4´.45
Cost of Binder & Solvent, USD	259.5 (100%)	306.4 (100%)	148.7 (57.3%)	155.4 (50.7%)

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Comparison of Formula Difference By Using PVDF and LHB-108P In Anode

For 100 kg Total Solid Weight		
	Using PVDF	**Using LHB-108P**
	Graphite (BET ~4)	**Graphite (BET ~4)**
Active Material	90 Kg	93 Kg
Conducting Carbon	3 Kg	3 Kg
Binder	7 Kg	3.5 Kg (23.33 Kg)
Solvent	122.22 Kg	80.17 Kg
Solid-Content	45%	50%

LICO Technology Corp.

Comparison of Energy Density By Using PVDF and LHB-108P In Anode

For 100 kg Total Solid Weight		
	Using PVDF	**Using LHB-108P**
	Graphite (BET ~4)	**Graphite (BET ~4)**
Electrode Density	1.4 g/ml	1.5 g/ml
Specific Capacity	320 mAh/g	320 mAh/g
Usage Index of Material	1	1.03 (+ 3%)
Density Efficiency	1	1.07 (+ 7%)
Energy Density Efficiency	1	1.10 (+10%)

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Comparison of Cost Difference By Using PVDF and LHB-108P In Anode

For 100 kg Total Solid Weight		
	Using PVDF	**Using LHB-108P**
	Graphite (BET ~4)	**Graphite (BET ~4)**
Active Material	90 Kg	93 Kg
Conducting Carbon	3 Kg	3 Kg
Binder	7 Kg	3.5 Kg (23.33 Kg)
Solvent	122.22 Kg	80.17 Kg
Solid-Content	45%	50%
Cost Formula	**7´36.5+122.22´3.5**	**23.33´13.5+80.17´.45**
Cost of Binder & Solvent, USD	**683.27 (100%)**	**351.08 (51.4%)**