

CPS-LiPC

Functional Additive for Si Anode Binders

Technical Data Sheet (TDS) | CPS Inc.

Product Overview

CPS-LiPC is an ultra-low-viscosity ionic interfacial functional material based on aqueous Li-PAN and citric acid (CA). It is designed as a functional Anode additive for blending with conventional CMC/SBR binders to evaluate the potential for improved interfacial binding, Li⁺ transport, and high-rate performance in Si-based anodes.

1. Purpose of Application to Si Anode Binders

- Complementing conventional CMC/SBR: CPS-LiPC is partially blended into the existing aqueous binder system while retaining the conventional CMC/SBR platform.
- Interfacial binding support: Evaluates the potential to improve polar and ionic interfacial binding among Si/C active material, binder, and conductive additive.
- Li⁺ transport pathway support: Evaluates the potential to improve high-rate charge/discharge performance through formation of an ionic polymer network within the electrode.
- Compatibility with aqueous processing: The ultra-low-viscosity aqueous solution can be introduced stepwise into conventional CMC/SBR slurry processes.

2. Typical Properties and Product Characteristics

Item	Typical Range / Property	Remarks
Appearance	Clear to pale-yellow aqueous solution	Low-odor solution
pH	7.0 ± 0.2	Neutral range
Solid Content	7.5 ± 0.5 wt%	Can be diluted to suit customer process
Viscosity	30 ± 10cP Brookfield, 2 rpm, 25°C	Values may vary depending on measurement conditions
Dispersion Medium	Water	Aqueous process
Key Features	Low viscosity · ionic functionality · binder interfacial functionalization	Si anode binder additive

3. Recommended Applications

CMC/SBR aqueous binder systems for Si/C and Si-based anodes — Evaluate by replacing or blending a portion of conventional CMC/SBR with CPS-LiPC.

※ Recommended blend ratio on a binder-solids basis: CMC/SBR : CPS-LiPC = 9:1 to 5:5. The optimum ratio should be verified according to the electrode formulation and customer process.

4. Recommended Evaluation Design

Condition	CMC/SBR	CPS-LiPC	Evaluation Purpose
Control	100	0	Conventional binder control
9:1	90	10	Low-level additive effect
8:2	80	20	Enhanced interfacial functionality
7:3	70	30	Performance/process balance
6:4	60	40	High-content effect
5:5	50	50	Maximum blend comparison

※ Blend ratios are based on binder solids. For comparison, it is recommended to keep all other conditions identical, including total binder content, active material, conductive additive, and electrode loading.

5. Key Evaluation Items and Expected Effects

- Compare initial coulombic efficiency (ICE), initial charge/discharge capacity, and electrode expansion behavior.
- Compare high-rate performance through C-rate testing at 1C/3C/5C/7C, etc.
- Conduct initial cycle-life screening of at least 50 cycles in half cells, followed by long-term cycling evaluation.
- Measure peel strength and observe electrode cracking/delamination.
- Compare changes in interfacial resistance and charge-transfer resistance by EIS.

6. Application Guide

- Always include a conventional CMC/SBR control and evaluate under identical conditions.
- Homogenize Li-PAN/CA by low-speed stirring before use and, if necessary, dilute with DI water to adjust slurry solids content.
- For initial screening, evaluate stepwise from 9:1 to 5:5 and select the optimum balance among performance, viscosity, and adhesion.
- It is recommended to first confirm reproducibility of high-rate performance at the 6:4 condition, then explore the optimum point toward 7:3 and 9:1.

7. Handling and Storage

Store tightly sealed at room temperature. Avoid freezing, high temperatures, and prolonged exposure to direct sunlight. After long-term storage, check appearance, pH, viscosity, and sedimentation before use.

Final performance should be confirmed through the user's actual electrode manufacturing and cell evaluation.