

CPS-LiPC

Aqueous Binder Additive for Supercapacitors

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 binder additive for use with conventional aqueous binders in activated-carbon-based supercapacitor electrodes to evaluate the potential for improved electrode binding, ion transport, and carbon interfacial stabilization.

1. Purpose of Supercapacitor Application

- **Activated-carbon interfacial binding support:** May improve electrode structural stability by supporting contact and binding between activated-carbon and conductive-additive particles.
- **Li⁺/electrolyte interfacial transport support:** Evaluates the potential to improve ionic transport and interfacial transfer characteristics within the electrode using the polar and ionic functionalities of CPS-LiPC.
- **Complementing aqueous binder functionality:** Can be used with conventional aqueous binders such as CMC/SBR to evaluate the balance among adhesion, dispersion, and high-rate charge/discharge performance.
- **Ultra-low-viscosity processability:** Designed as a low-viscosity aqueous solution in the tens-of-cP range for easy addition at low levels to conventional wet-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 ± 10 cP	Brookfield, 2 rpm, 25°C
Dispersion Medium	Water	Aqueous process
Key Features	Ultra-low viscosity · ionic functionality · carbon interfacial functionalization	Activated-carbon electrode binder additive

3. Recommended Applications

Activated-carbon-based aqueous supercapacitor electrodes — Functional binder additive for blending with CMC/SBR, CMC, SBR, or other aqueous binders.

※ This product is primarily recommended as an additive blended at a low level to complement interfacial functionality and ion transport, rather than as a full replacement for the conventional binder.

4. Recommended Evaluation Design

Category	Control	CPS-LiPC Test Group	Key Evaluation Items
Binder Composition	Conventional aqueous binder 100%	Conventional binder : CPS-LiPC = 9:1 → 8:2 → 7:3 → 6:4 → 5:5	Slurry viscosity, coatability, adhesion

Electrode Fabrication	Conventional activated-carbon electrode formulation	Keep active material, conductive additive, and total binder amount constant	Electrode density, dry-film uniformity, delamination
Electrochemical Evaluation	Control electrode	CPS-LiPC-blended electrode	ESR, capacitance, high-rate retention, cycle life, EIS

5. Expected Effects

- Potential improvement in binding between activated-carbon/conductive-additive particles and electrode structural stability.
- Potential improvement in ionic transport pathways and interfacial transport characteristics within the electrode.
- Potential improvement in high-rate charge/discharge characteristics and ESR compared with conventional CMC/SBR.
- Potential suppression of electrode-layer cracking and delamination during repeated charge/discharge cycling.
- Easy integration into conventional slurry processes due to the ultra-low-viscosity aqueous formulation.

6. Application Guide

- For initial evaluation, maintain the conventional aqueous binder as the control and vary only the CPS-LiPC blend ratio stepwise.
- Keep the total binder solids equal to the control to compare the effect of CPS-LiPC.
- After checking slurry viscosity and electrode coatability, adjust the final solids content with DI water if necessary.
- For final evaluation, compare adhesion, ESR, EIS, high-rate retention, and long-term cycling performance together.

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 in supercapacitor electrodes should be confirmed through the user's actual slurry preparation, electrode processing, and electrochemical evaluation.