

# JEFFSOL® MEOX SOLVENT FOR ELECTRODE CASTING

**HUNTSMAN**

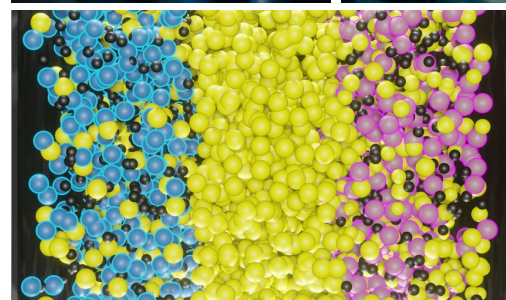
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**Huntsman** is an established chemical supplier with a history of commercializing innovations to enable next generation technologies through a wide variety of materials and advanced chemistries, a robust global footprint, dedicated regional manufacturing, and a commitment to investing in industries such as energy storage. **Huntsman's** battery materials portfolio includes products to increase capacity, lengthen cycle life, and improve charging times.

## PRODUCT OVERVIEW

**JEFFSOL® MEOX** is a polar aprotic solvent for use in a wide range of applications due to its excellent solvency, relatively high flash points, low vapor pressure, and ease of handling. It is soluble in most organic solvents and water, and has a relatively low hazard profile.

**JEFFSOL® MEOX** can efficiently dissolve binders including PVDF, aids in carbon or conductive additive dispersion stability, and can be used to safely cast cathodes for lithium-ion batteries. It is a suitable alternative to NMP in battery manufacturing process and computational modeling has demonstrated compatibility with existing manufacturing processes including solvent recovery.



## BENEFITS

- High polarity aprotic solvent
- Low vapor pressure and low odor
- Not rated as hazardous air pollutant
- Less hygroscopic than NMP
- High flash point, nonflammable
- Excellent solvency of PVDF for NMC and LFP cathodes
- Comparable rheology in NMC/PVDF slurries to NMP
- Good compatibility with aluminum
- Ease of condensation may reduce energy and complexity in recovery systems



Article on  
**JEFFSOL® MEOX** as a  
Substitute Solvent for NMP  
in Battery Manufacturing

## TYPICAL PROPERTIES

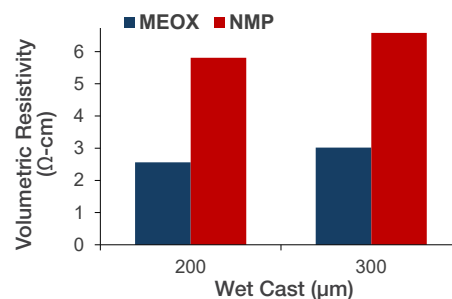
	NMP (Reference)	JEFFSOL® MEOX
Structure		
Molecular Weight	99	101
Viscosity (cP@25°C)	1.7	3.0
Flash Point (°C, cc)	86	113
BP (°C)	202	259
MP (°C)	-25	15
Contact Angles on Al*	54.1	62.5
VOC (ppm)**	1558	19
48-Hr Water Absorption (%)***	6%	4%
Dipole Moment	4.09	4.13
Solubility Parameter		
dD	18.0	18.1
dP	12.3	10.9
dH	7.2	11.8

\* Contact angle measurements were collected with neat solvents on aluminum substrate using Dataphysics OCA 25 Instrument.

\*\* VOC measurements were recorded with Honeywell MiniRAE 3000+ Photoionization Device at room temperature, 25% humidity.

\*\*\* Samples stored at 85% humidity, water measured with Karl-Fischer titration.

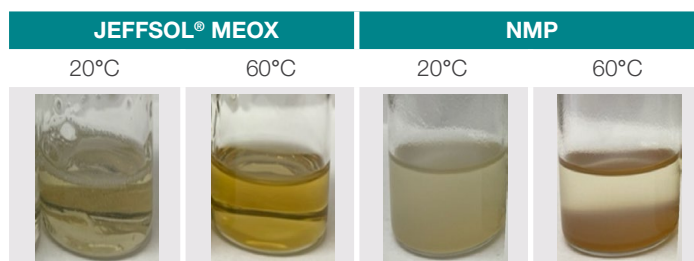
## Resistivity



Electrodes prepared with MEOX result in lower resistance electrodes, improving cell cycling.

LFP electrodes prepared with MEOX and NMP measured with HIOKI meter after calendaring.

## Solubility of 8 wt% PVDF



Performance Products

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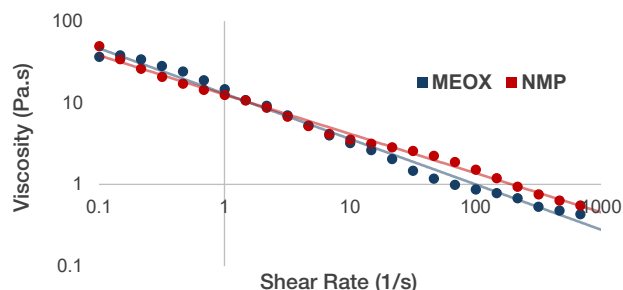
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## APPLICATION TESTING

### Slurry Preparation and Properties

#### NMC Slurry Rheology

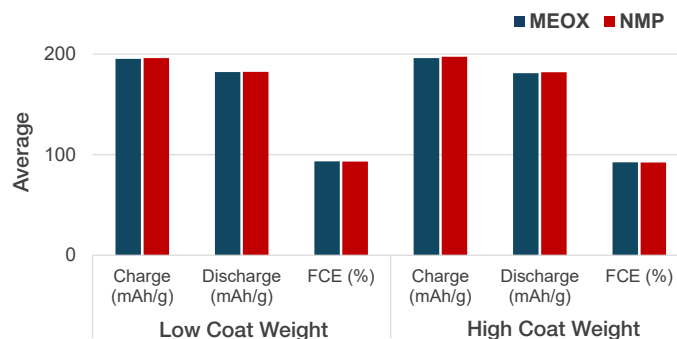


JEFFSOL® MEOX and NMP showed comparable slurry rheology.

Slurries prepared with of 96 wt% NMC622, 2 wt% PVDF KYNAR® HSV900, and 2 wt% conductive additive. Total 70 wt% solids.

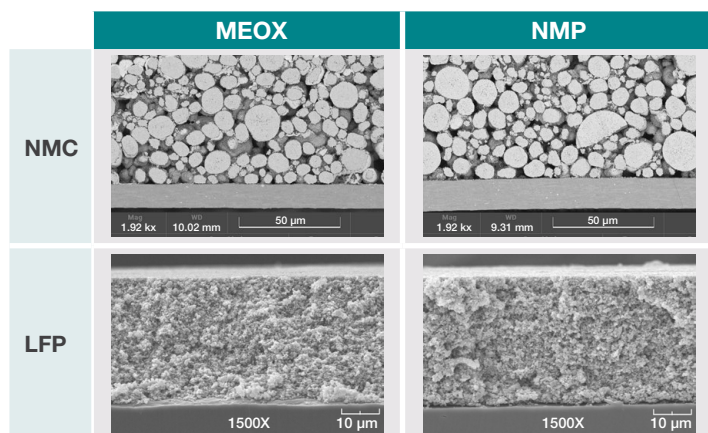
### Cell Formation

#### NMC Cell Formation



### Cathode Casting

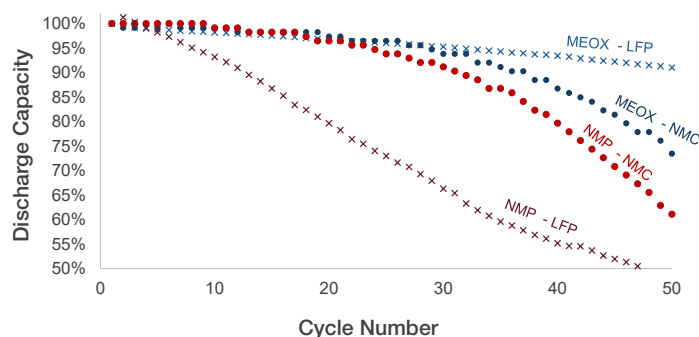
#### SEM Morphology Comparison



Cathode coatings made with JEFFSOL® MEOX and NMP showed comparable coating properties and SEM dry structure morphology for both LFP and NMC based cathodes.

### Cell Cycling

#### LFP and NMC



Lifetime cycling shows cells prepared with JEFFSOL® MEOX had equal or improved capacity retention over 50 cycles.

Half cell coin cells, Li metal anode. NMC cells cycled at C/2, electrolyte 1M LiPF<sub>6</sub>, EC:EMC (3:7 vol%) + 1 wt% VC, separator H1609. LFP cells cycled at 1C, electrolyte 1M LiPF<sub>6</sub>, EC:EMC (1:1 vol%), separator H1612.

For more information, contact your local Huntsman representative. [www.huntsman.com](http://www.huntsman.com) / [AdTech@huntsman.com](mailto:AdTech@huntsman.com)

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