Huntsman Battery Materials

1B14 - NAATBATT 2023

HUNTSMAN

Enriching lives through innovation

Our Solutions Drive Significant Emission Reductions

~750M tons

of lifetime **emissions avoided** each year by our product solutions

Source: Management estimates assured by a third-party review

Disclaimer

While the information contained herein is to the best of our knowledge, information and belief accurate at the date of publication, it is the responsibility of recipients to determine the applicability of the suitability of such information for their own particular purpose. Huntsman International LLC accepts no responsibility for any damages of any nature resulting from the use of, reliance upon, or the misuse of such information for any purpose.

Forward-Looking Statements

This presentation includes “forward-looking statements” within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. These forward-looking statements include statements concerning our plans, objectives, goals, strategies, future events, future revenue or performance, capital expenditures, financing needs, plans or intentions relating to acquisitions or strategic transactions, business trends and any other information that is not historical information. When used in this presentation, the words “estimates,” “expects,” “anticipates,” “likely,” “projects,” “outlook,” “plans,” “intends,” “believes,” “forecasts,” or future or conditional verbs, such as “will,” “should,” “could” or “may,” and variations of such words or similar expressions are intended to identify forward-looking statements. These forward-looking statements, including, without limitation, management’s examination of historical operating trends and data, are based upon our current expectations and various assumptions and beliefs. In particular, such forward-looking statements are subject to uncertainty and changes in circumstances and involve risks and uncertainties that may affect the company's operations, markets, products, prices and other factors as discussed in the Company’s filings with the U.S. Securities and Exchange Commission. Significant risks and uncertainties may relate to, but are not limited to, ongoing impact of COVID-19 on our operations and financial results, volatile global economic conditions, cyclical and volatile product markets, disruptions in production at manufacturing facilities, timing of proposed transactions, reorganization or restructuring of the Company’s operations, including any delay of, or other negative developments affecting the ability to implement cost reductions and manufacturing optimization improvements in the Company’s businesses and to realize anticipated cost savings, and other financial, operational, economic, competitive, environmental, political, legal, regulatory and technological factors. Any forward-looking statement should be considered in light of the risks set forth under the caption “Risk Factors” in our Annual Report on Form 10-K for the year ended December 31, 2020, which may be supplemented by other risks and uncertainties disclosed in any subsequent reports filed or furnished by the Company from time to time. All forward-looking statements apply only as of the date made. Except as required by law, the Company undertakes no obligation to update or revise forward-looking statements to reflect events or circumstances that arise after the date made or to reflect the occurrence of unanticipated events.

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Huntsman Corporation

is a publicly-traded global manufacturer and marketer of differentiated and specialty chemicals. Our products number in the thousands and are sold worldwide to manufacturers serving a broad and diverse range of consumer and industrial end markets.

- ~ 9,000 Associates
- ~ 70 Locations in 30 Countries
- Headquarters and R&D in Houston, Texas
- 2021 Revenue of USD 8.5 billion
- Listed on NYSE in 2005

Huntsman Businesses

Polyurethanes
$5.0B Revenue

Performance Products
$1.5B Revenue

Advanced Materials
$1.2B Revenue

HUNTSMAN BATTERY MATERIALS

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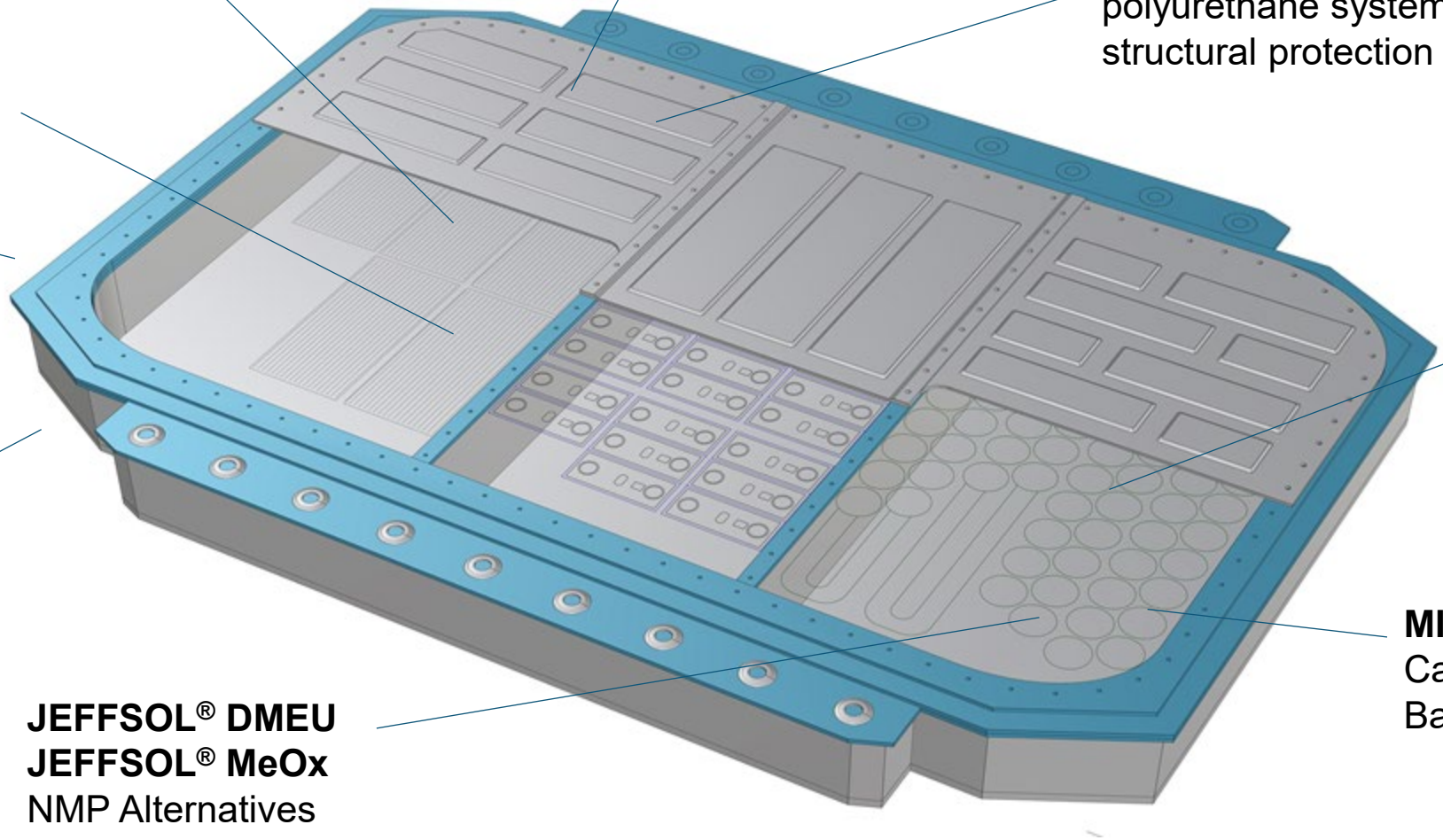
ULTRAPURE® Carbonates
Electrolyte solvents

ARALDITE®
Composite Box

RIMLINE®, VITROX®, SHOKLESS™
polyurethane system for thermal and structural protection

JEFFAMINE® Amine
Solid Electrolytes

ARALDITE®
Adhesives for The Battery Box



ARATHANE®
Encapsulation Systems

EUREMELT
Thermoplastic Polyamides for The Battery Box

MIRALON®
Carbon Materials for Battery Cells

JEFFSOL® DMEU
JEFFSOL® MeOx
NMP Alternatives

HUNTSMAN BATTERY MATERIALS

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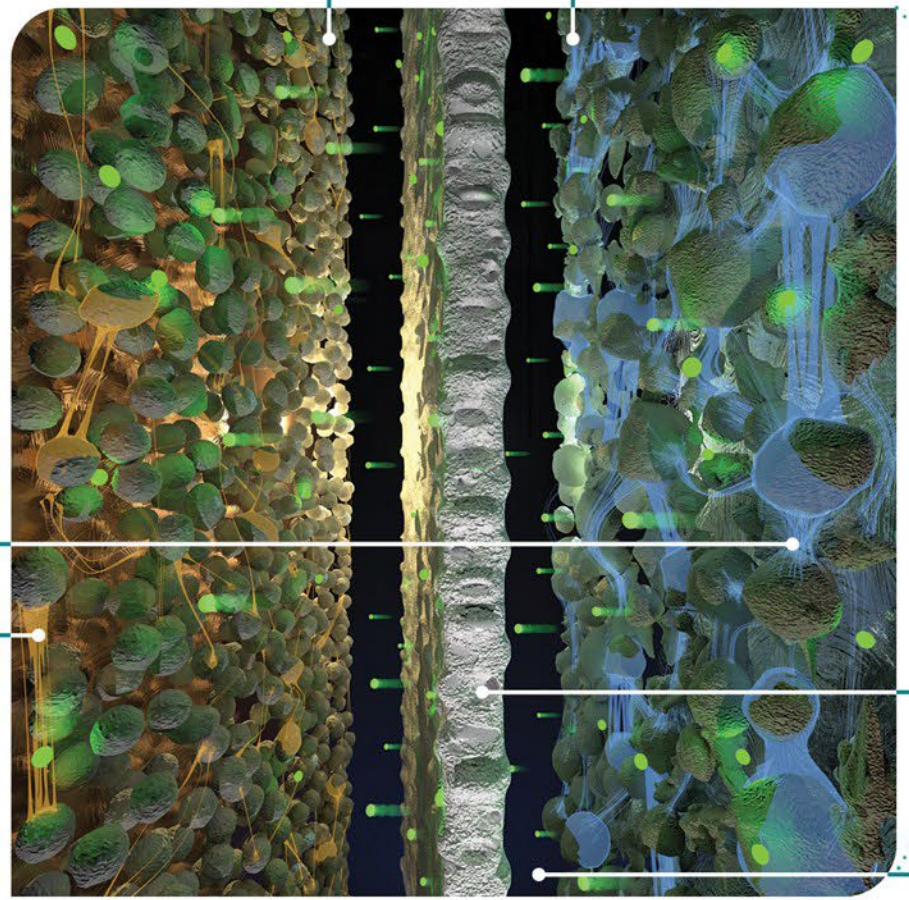
Dispersant
JEFFSPERSE® Dispersant

Binders
JEFFAMINE® Amine
Polyurethane Binder



Conductive Additive
MIRALON®
Carbon Materials

Separator
ELASTAMINE® and
JEFFAMINE® Amine

Solvents for Electrolytes
ULTRAPURE® Ethylene Carbonate
ULTRAPURE® Propylene Carbonate
JEFFAMINE® Amine for Solid Electrolytes

Enabling Next-Generation of Cell Technologies

ULTRAPURE® Ethylene Carbonate

Growth in Electric Vehicles Creates Increasing Demand

Huntsman's Advantage

- Huntsman is the only North American producer of alkylene carbonates, including ULTRAPURE® Ethylene Carbonate and ULTRAPURE® Propylene Carbonate
- Innovating around core strengths in carbonate and amine technology

Investment

1974	Conroe Ethylene Carbonate plant
1999	ULTRAPURE® introduced
2012	Conroe, TX production of ULTRAPURE®
2013	Introduced EV grade specifically tailored for Electric Vehicles
2023	**Major expansion in USA**
FUTURE	Possible additional expansions in US and Europe

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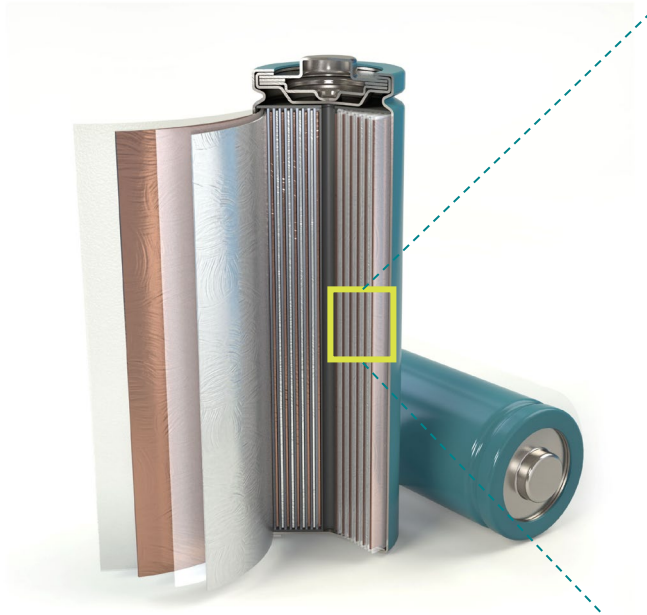
Building Blocks for Batteries



JEFFSOL® MeOX is an alternative to NMP. It is under development as solvent to PVDF for electrode casting. Samples are available to evaluate.

JEFFAMINE® polyether amine are versatile and efficient building blocks for high-performance batteries: gel and solid electrolyte components, crosslinkers for binders, and as surface modifiers for high nickel cathode active materials, the tunable EO and PO chains impart rigidity and hydrophobicity

JEFFSPERSE® dispersants can be tuned with different EO/PO ratios to provide different HLB-values, Wide Molecular Weight range, Flexible Polyether Backbone, and Amine Functionality for further modification

MIRALON® Carbon Materials

MIRALON® Solution, Market Applications & Scale-Up Plan

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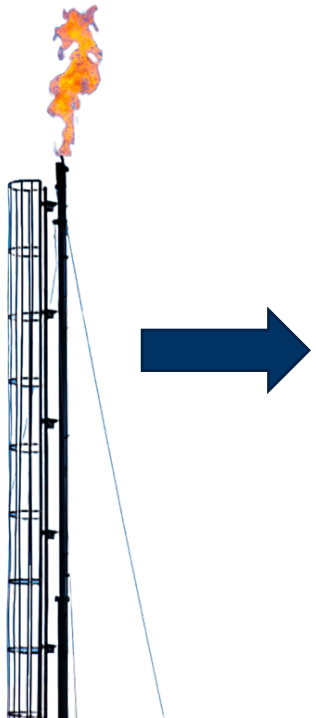
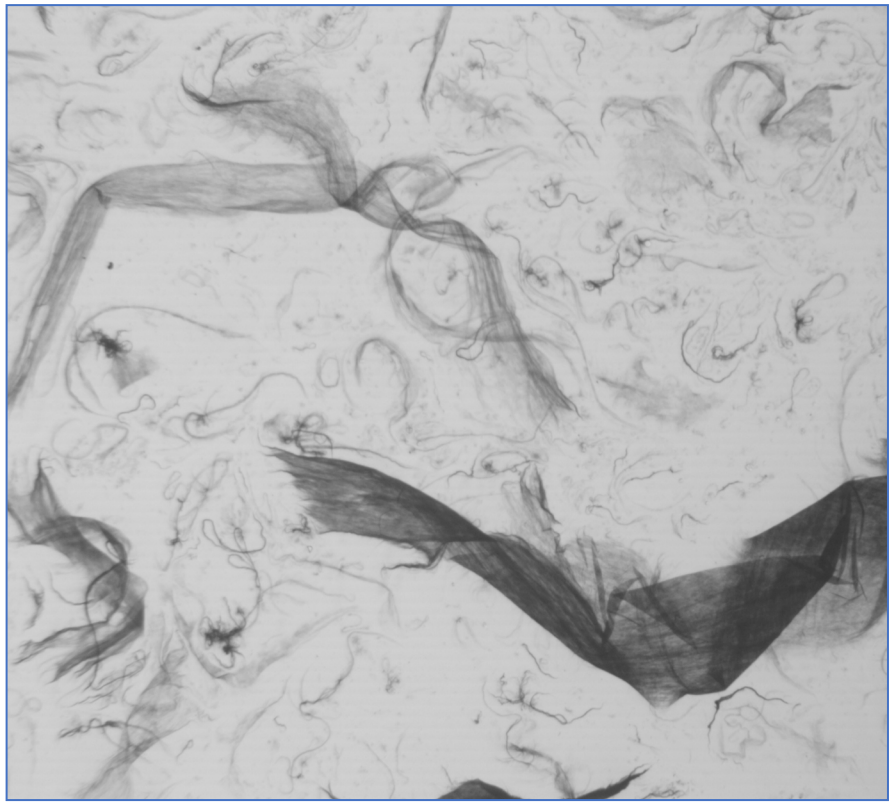
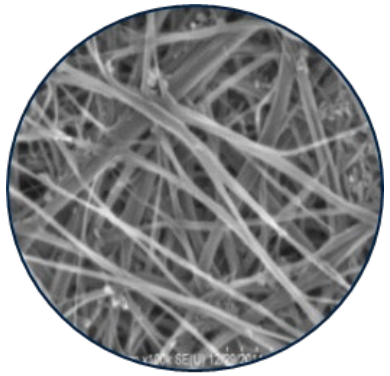
Problem

Oil & Gas industry flares natural gas:

- Methane has 28x more global warming protentional than CO_2







Miralon®

2010	Technology development
2015	Lab scale & experimental sales
2019	Micro plant & experimental sales
2021	Mini plant & experimental sales
2022	Pilot Plant & commercial sales
2023	1st Commercial scale plant 30 tones/year Step change in unit cost
2024+	Replicate, scale & improve

ARALDITE® Resin Systems

for Composite Battery Housings can save up to 40% weight

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ARALDITE® epoxy systems enable composite battery housings to meet GB/T 31467.3-2020, UL94 or GB/T 2408 certification goals, impart EMI shielding, and at mass production scale

ARATHANE® polyurethane resins enable battery cell encapsulation with well-balanced adhesion and heat dissipation properties with UL 94 V0 flame retardancy rating

EUREMELT® enables encapsulation of electronic devices in a single step of low-pressure molding with advantages of sustainable materials based on renewable resources (up to 90 w% depending on grade), no solvent needed, curing reversible by melting, and safe due to low tox profile

Polyurethanes – concepts of composite systems

Solutions to Reduce Weight, Enhance Performance, Improve Safety, and Optimize Process

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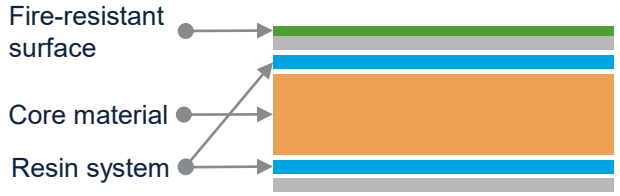
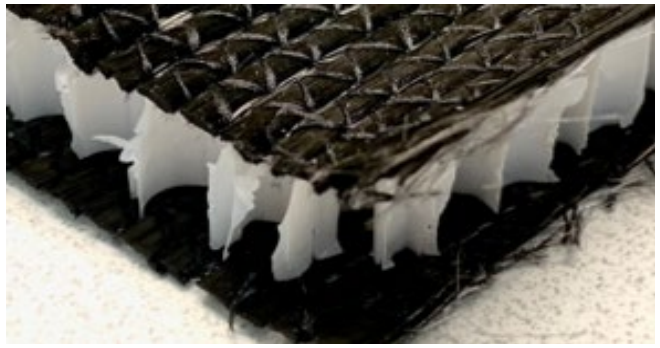
Sandwich panel design with lightweight core material

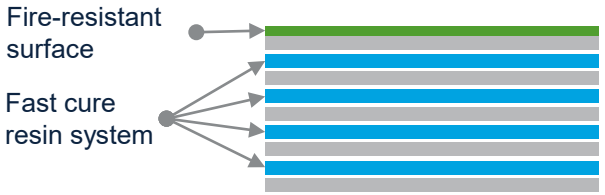


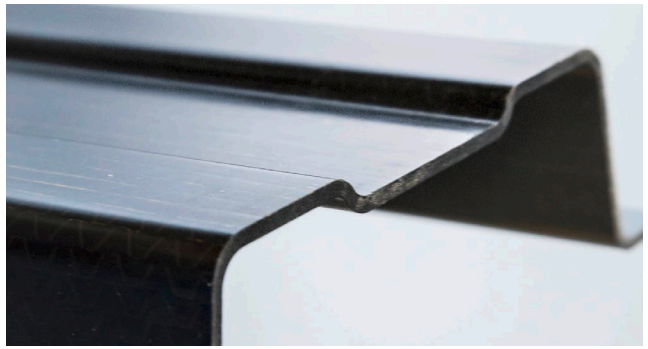


VITROX® HC Advanced CSM system

- Resin on glass or carbon fiber reinforcement over a polycarbonate honeycomb core
- High stiffness-to-weight ratios, tunable resin reactivity, broad processability
- High part integration capability, complex geometries, low tooling cost and low molding pressure

Mass production resin system with addition of intumescent function on the surface

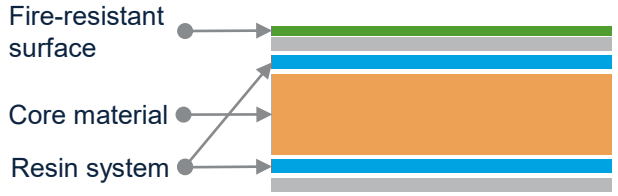


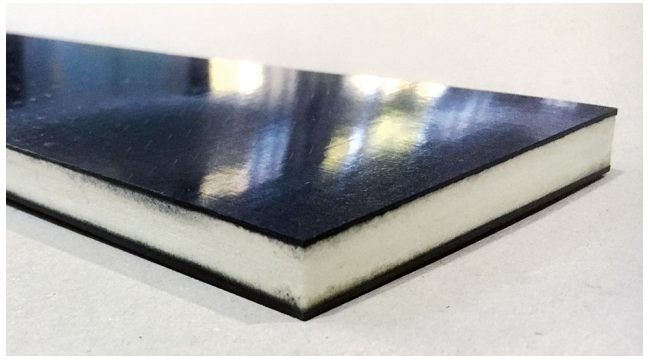


VITROX® RTM polyurethane system

- Low viscosity, short cure time, and tunable injection time
- Thermal resistance and strong fiber-matrix adhesion
- Can be used for semi-structural and structural applications

Sandwich panel design with lightweight core material





RIMLINE® FC system for a foam core boards

- Large density range
- Moldable in 3D and ready to Overmold
- Usable in RTM and WCM

Sustainability at Huntsman

The future means making tomorrow possible

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Tomorrow Made Possible

- We take our responsibilities seriously – it is not viable to create high performance products if the planet pays the price
- Implementing division-wide best practices to ensure we operate as efficiently, sustainably, and ethically as possible
- Developing a broad range of products and technologies that enable our customers to achieve their sustainability goals

"We make tomorrow a cleaner, safer place through efficient solutions that reduce waste, last longer, and lower our customers' impact on the environment."

THANK YOU FOR YOUR ATTENTION

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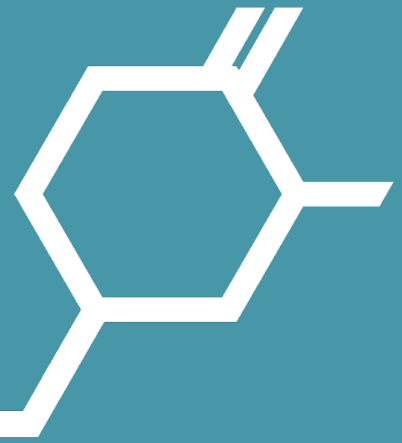
More details on offerings:



MADE POSSIBLE

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Products and Samples Available

	Product	Description	Availability
Cathode	**MIRALON® Pulp**	MWCNT pulp that performs like SWCNT	• Manufacturing in Merrimack, NH plant • Samples Available Upon Request
	Non-Aqueous Dispersion	Pulp dispersed in PVDF/NMP solution	• Available in Various Concentrations • Samples Available Upon Request
	Aqueous Dispersion	Pulp dispersed in water-based solution	• **Development scale**

	Product	Description	Availability
Anode	**MIRALON® Pulp**	MWCNT pulp that performs like SWCNT	• Manufacturing in Merrimack, NH plant • Samples Available Upon Request
	Aqueous Dispersion	Pulp dispersed in water-based solution	• **Development scale**
	MIRALON® Sheet as Current Collector	Silicon-coated MIRALON sheet replacing graphite, copper, binder reducing anode mass	• **Development and testing underway**

Get the adhesive that's right for your job

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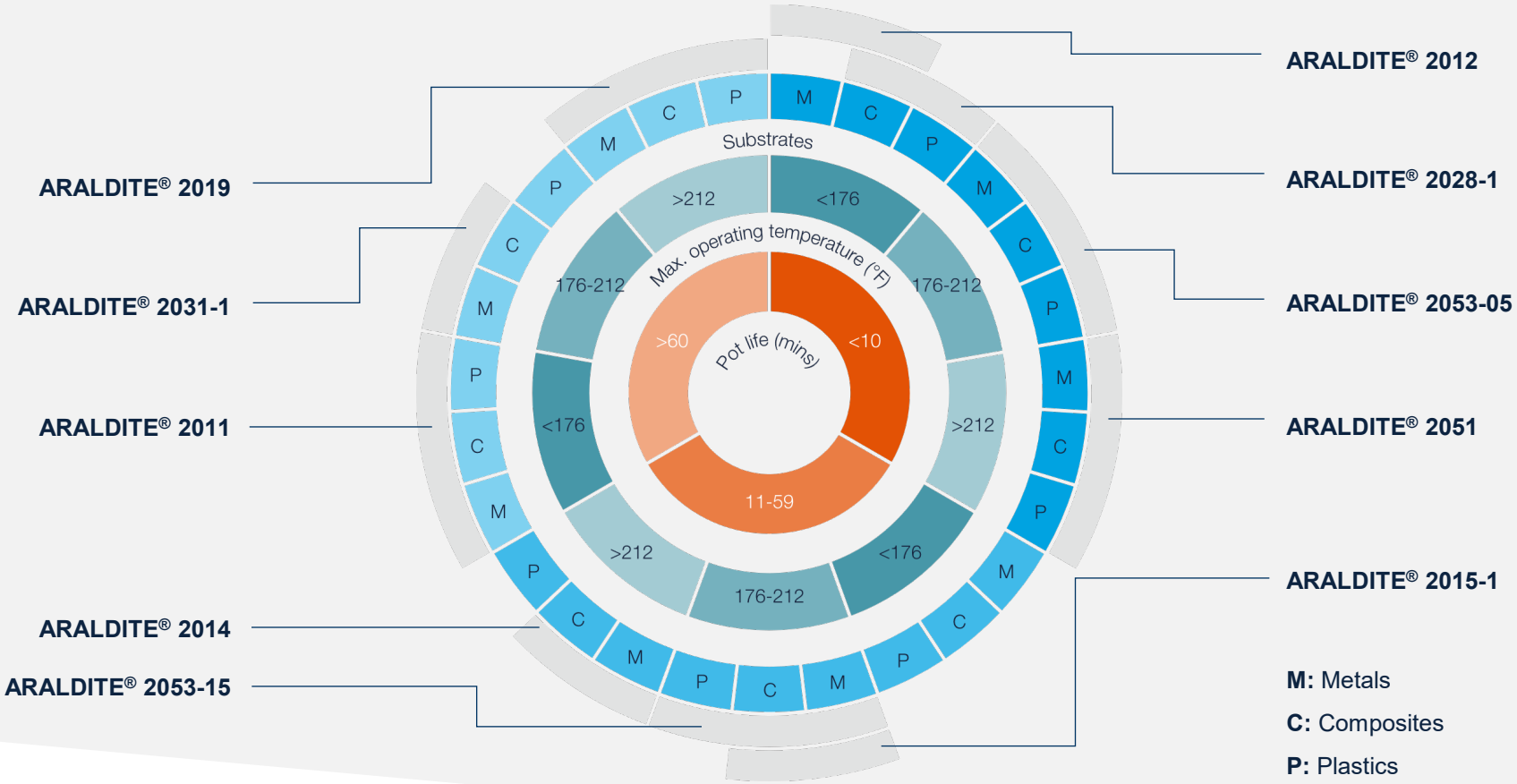
**In this chart, you can identify the product that matches the materials you are bonding,
the maximum operating temperature and the pot life you need.**

For more specific tasks, Huntsman offers 200+ other specialty adhesives you can rely on.



JEFFSOL® - developing less toxic NMP ALTERNATIVES:

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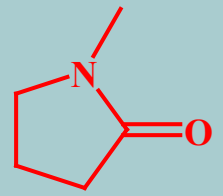
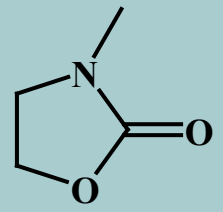
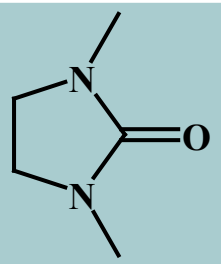
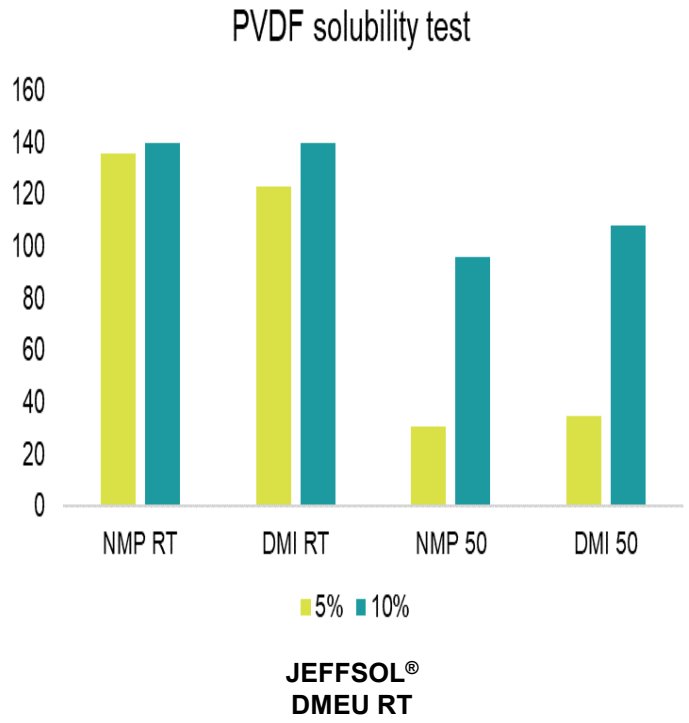
Huntsman Products compared to NMP

	NMP (not a Huntsman product)	JEFFSOL® MeOx XHE-117	JEFFSOL® DMEU XHE-123
			
Appearance	clear	clear	clear
Molecular Weight	99	101	114
Viscosity (cp @ 25 ℃)	1.67	3.00	1.94 (20 ℃)
Flash point (℃, cc)	86	113	95
b.p. (℃)	202	248	225
m.p. (℃)	-25	15	7.5
Dipole Moment	4.09	4.13	4.07
Solubility parameters dD dP dH	 18.0 12.3 7.2	 18.1 10.9 11.8	 18.0 10.5 9.7

- Solubility tests with a range of concentrations
- Measured time to fully dissolve



JEFFSOL®
DMEU RT

Performance Products

JEFFAMINE® in Batteries

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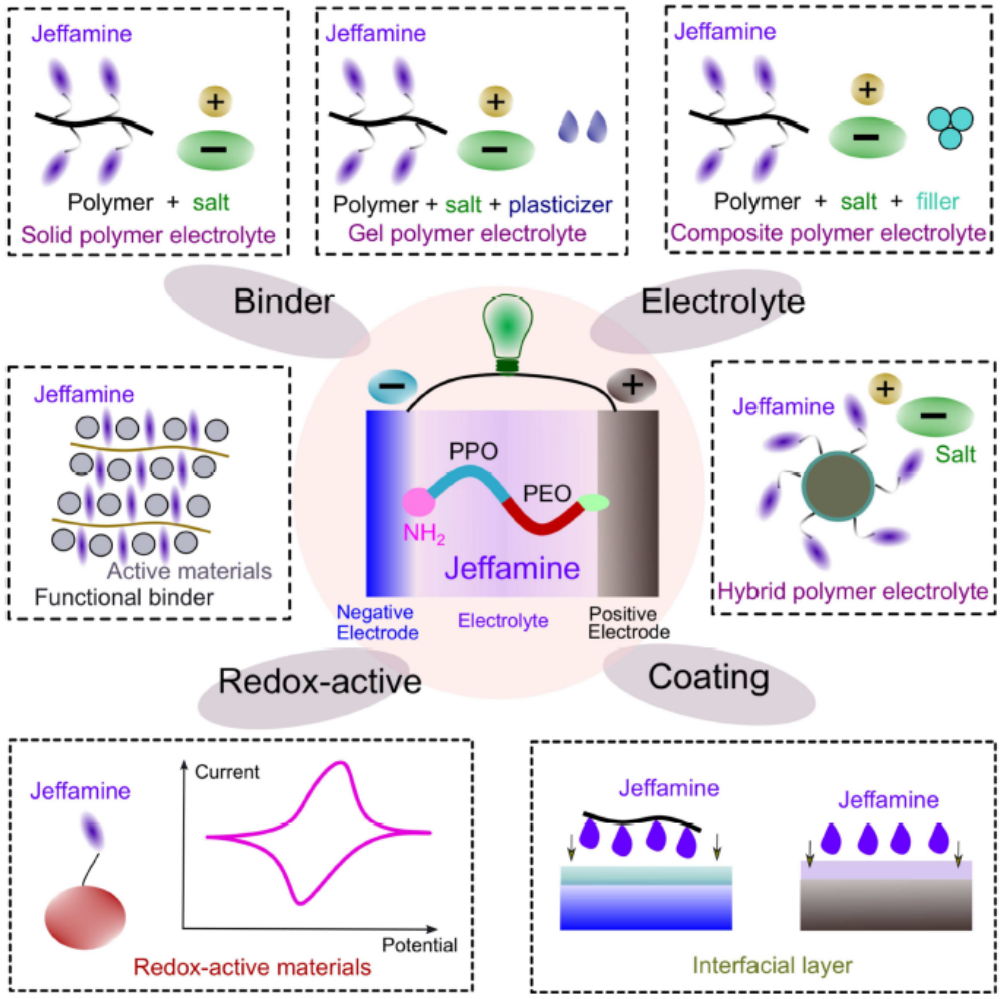
Versatile, efficient polyether amine building blocks for high-performance batteries



JEFFAMINE® Polyetheramines

- Properties
  - EO/PO chains impart tunable rigidity & hydrophobicity
  - Amine terminated for cross-linking with other polymers
- JEFFAMINE® modified PEO as a polymer electrolyte
  - better cycling
  - lower resistance
  - higher ion conductivity
  - higher breakdown voltage
- JEFFAMINE® modified PAN as a binder
  - Good binding ability for sulfur and LFP electrode materials
  - Improved homogeneity increases contact area
  - Amorphous & viscoelasticity improved integrity and cyclability
  - Improved solubility hence reduces need for solvents (NMP)
- JEFFAMINE® Interfacial engineering

Performance Products

Batteries & Supercaps **2020**, 3, e1900133

Dispersants for Electrode Slurries

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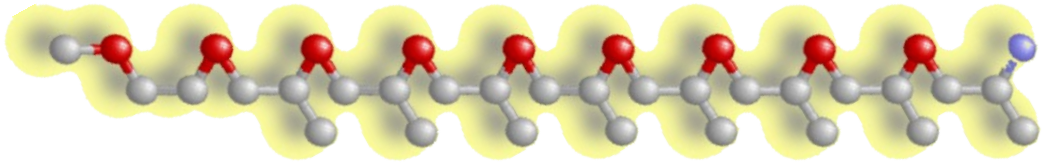
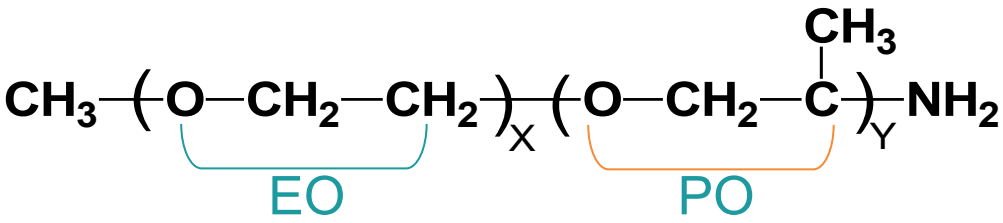
- JEFFSPERSE® X3503, X3200 series
  - Good dispersants for organic pigments and carbon black in water-based systems
- JEFFSPERSE® 4105
  - Designed for inorganic materials
- XHD-070
  - Experimental latest-generation dispersant
  - Many possibilities for fine-tuning
  - 50% in water, but solvents are an option





- Different EO/PO ratios provide different HLB-values
- Wide Molecular Weight range
- Amine Functionality for further modification
- Flexible Polyether Backbone

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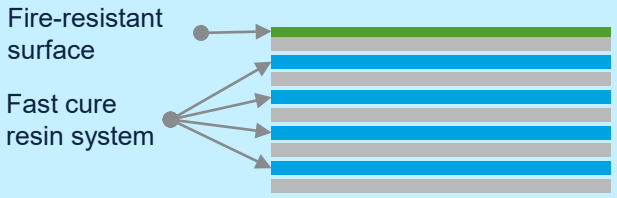
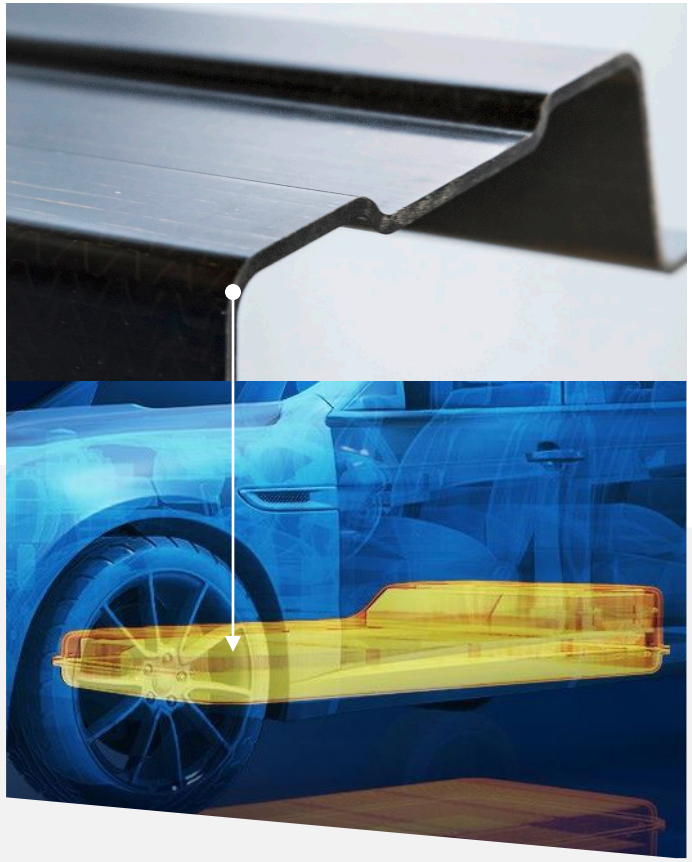
VITROX® RTM polyurethane system – for advanced toughness

VITROX® polyurethane RTM systems

Concept: Mass production resin system with addition of intumescent function on the surface





VITROX® RTM resins

- Low viscosity and tunable injection time
- Short cure time after injection
- Damage resistant
- Strong fiber-matrix adhesion
- Thermal resistance which can be used for semi-structural and structural applications

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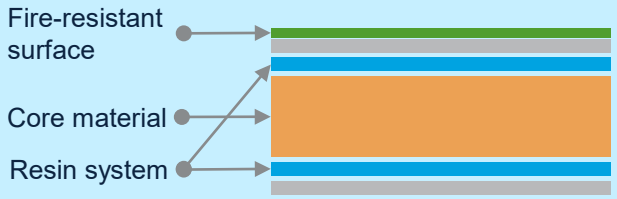
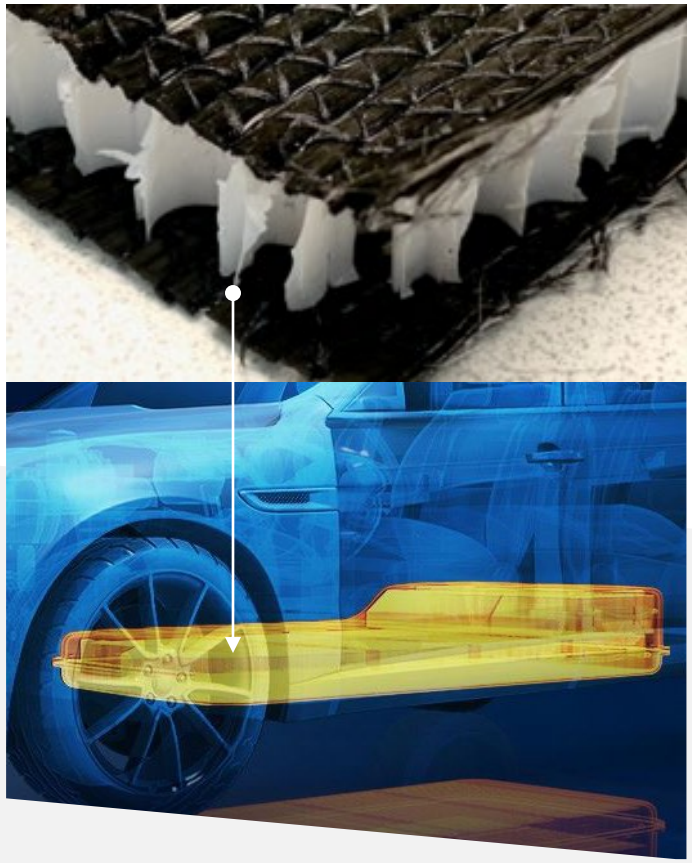
VITROX® HC polyurethane system – finetune your spray molding process

VITROX® HC advanced CSM systems

Concept: Sandwich panel design with lightweight core material





VITROX® HC advanced CSM systems

- Resin can be applied on glass or carbon fiber reinforcement over a polycarbonate honeycomb core
- High stiffness-to-weight ratios
- Tunable resin reactivity, broad processability
- High part integration capability, complex geometries
- Low tooling cost and low molding pressure

Solutions to reduce weight, enhance performance, improve safety, and optimize process

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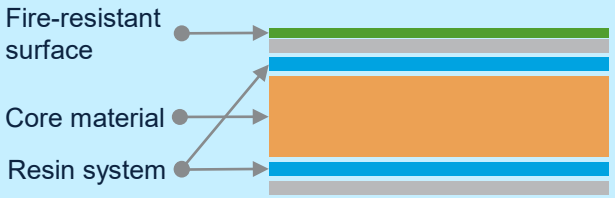
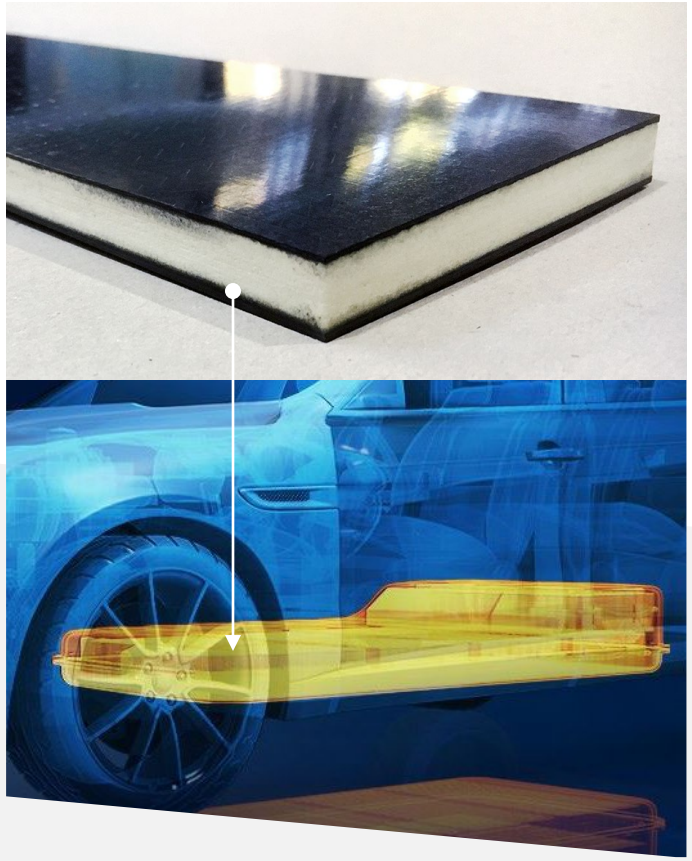
RIMLINE® FC polyurethane system – mold your foam core

RIMLINE® FC system for foam core

Concept: Sandwich panel design with lightweight core material





RIMLINE® FC system for foam core

- Large density range
- Moldable in 3D
- Ready to overmold
- Usable in RTM and WCM
- Outstanding property balance