

# NAATBatt 2019

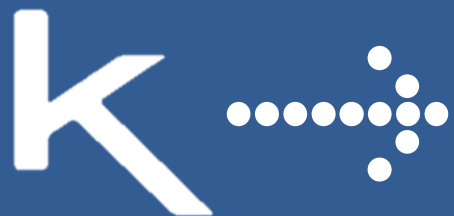
## Arkema Battery Solutions

**Jason Pomante**  
*North American Market Manager*

March 2019



**ARKEMA**  
INNOVATIVE CHEMISTRY



## ARKEMA OVERVIEW



**20,000**  
talents

11,000  
in Europe

4,000  
in North America

5,000  
in Asia and RoW



**WOMEN AND MEN  
AT THE HEART  
OF OUR  
DEVELOPMENT**



**> 10,000**  
customers

Collaborations  
with the largest  
global brands

**1,800**  
new hires  
every year



**€8.3 bn**  
sales

Presence in  
55 countries

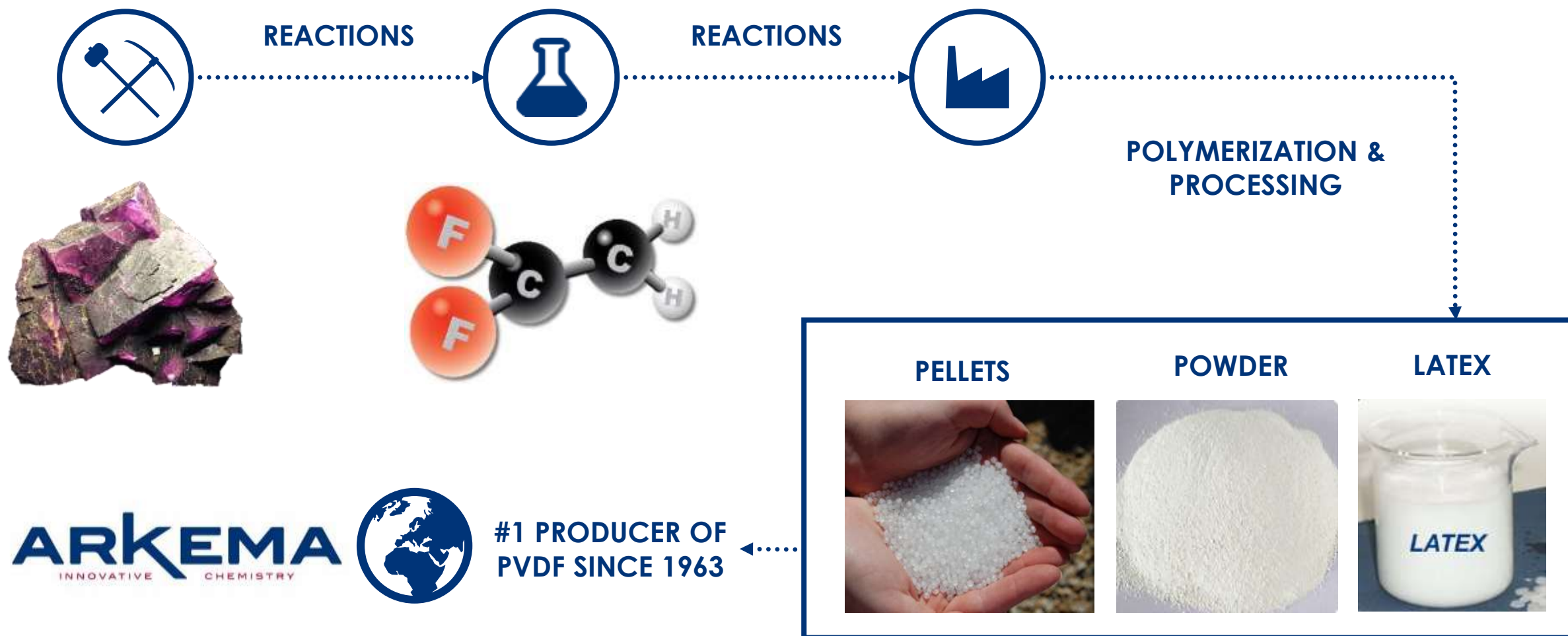
**136** plants  
**13** R&D  
centers

# BATTERY SOLUTIONS FOR LITHIUM ION BATTERIES

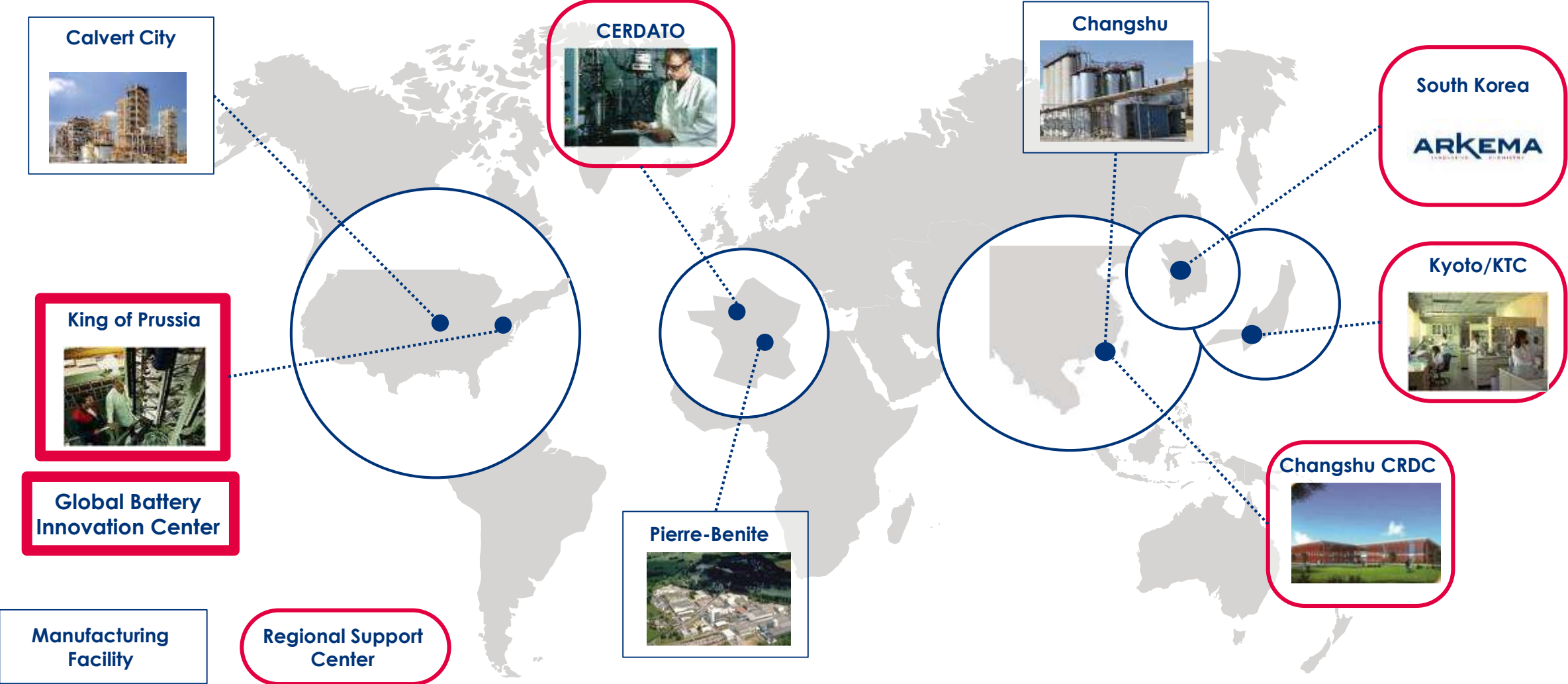




# INTEGRATED FROM THE MINE TO POLYMERIZATION



# KYNAR® PVDF GLOBAL FOOTPRINT

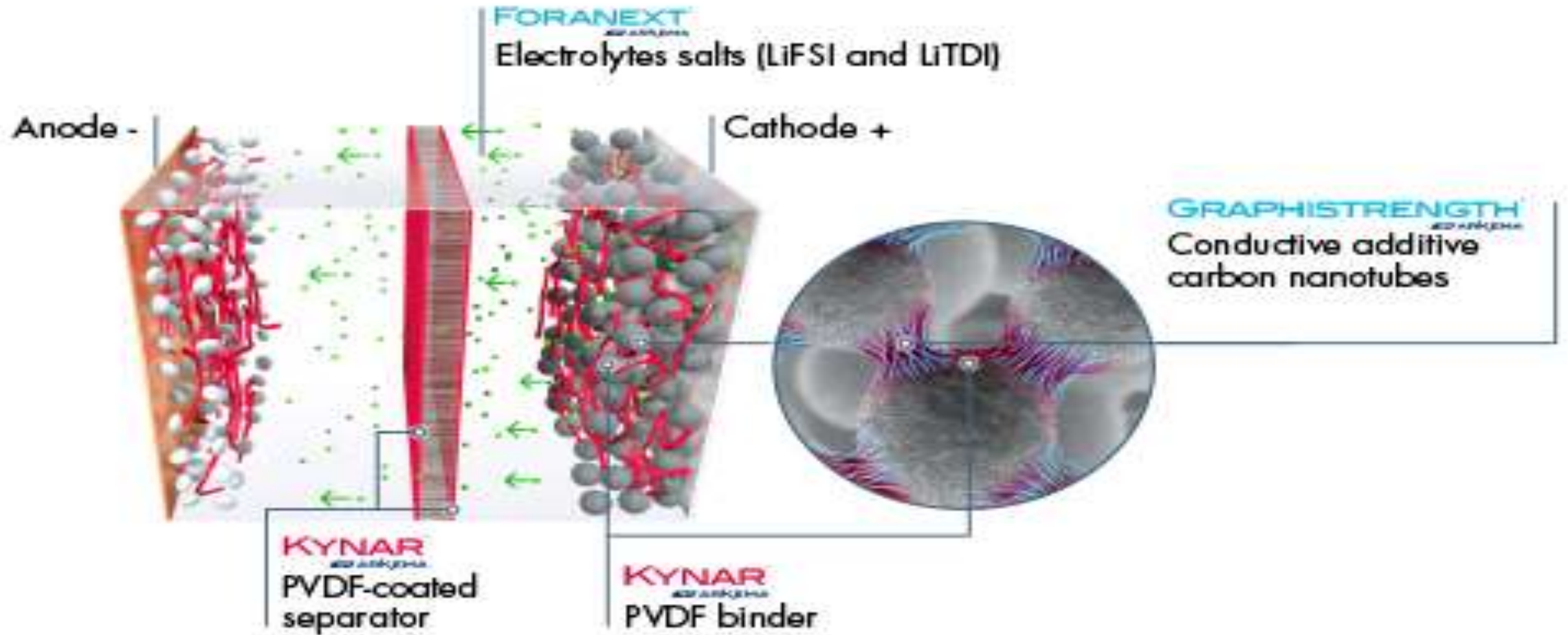




## KYNAR ROLES IN THE LIB



# ARKEMA BATTERY SOLUTIONS







## FOCUS ON BINDERS

# KYNAR® PVDF SOLUTIONS FOR CATHODE

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## HSV900

### KEY FEATURES

- ✦ Super high Mw Kynar® PVDF
- ✦ Good Adhesion
- ✦ Stable slurry behavior
- ✦ Low internal resistance
- ✦ Market reference for LCO, LFP and NMC111

## HSV1800

### KEY FEATURES

- ✦ Functionalized Kynar® PVDF
- ✦ Designed for Ni+ NMC, LTO and LFP
- ✦ Enhanced adhesion
- ✦ Fast dissolution in NMP

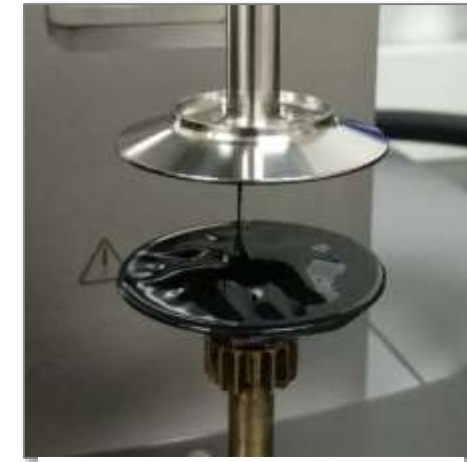
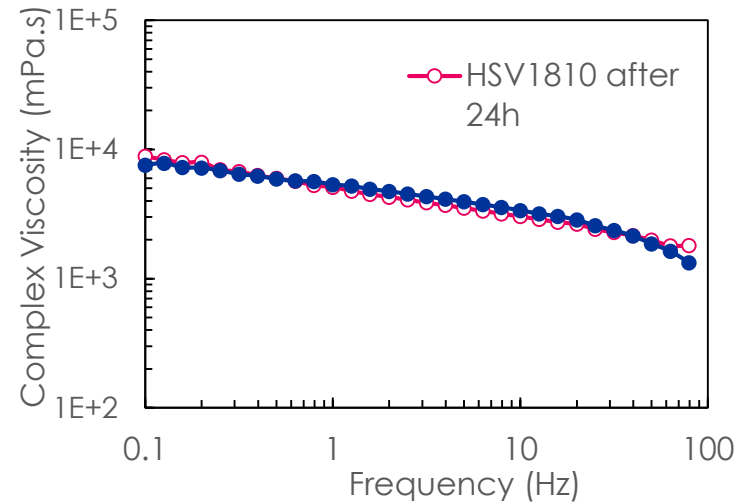
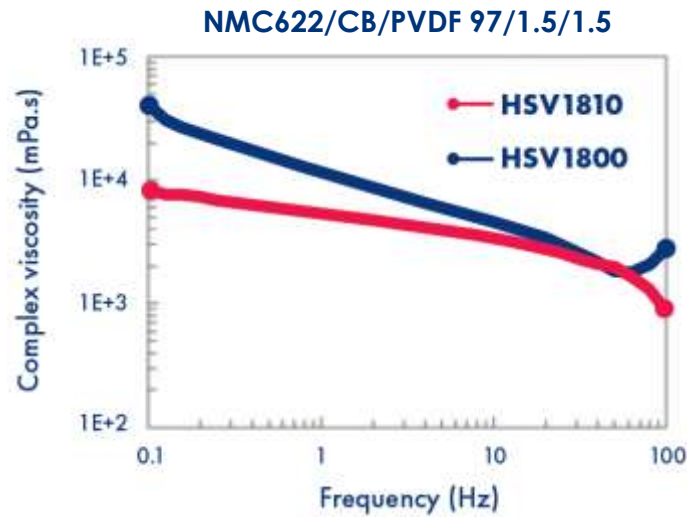
## HSV1810

### KEY FEATURES

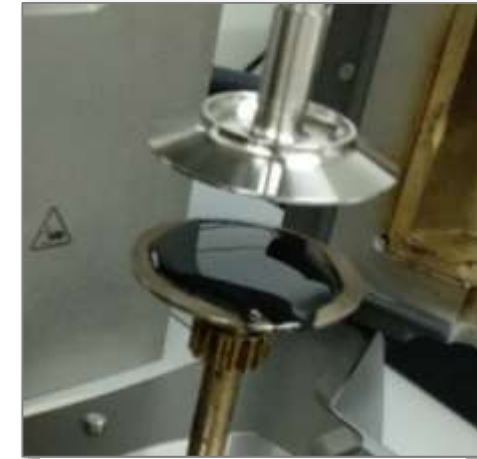
- ✦ Functionalized Kynar® PVDF
- ✦ Designed for Ni+ NMC/LFP
- ✦ Enhanced adhesion
- ✦ Fast dissolution in NMP
- ✦ Wider processing window in Ni+ NMC

# Wider processing window of **Kynar® HSV1810** vs HSV1800

## Lab scale slurry flowability



**Kynar® HSV1800**



**Kynar® HSV1810**

## Scale-up slurry flowability

**Scale-up**



**Kynar® HSV1810**



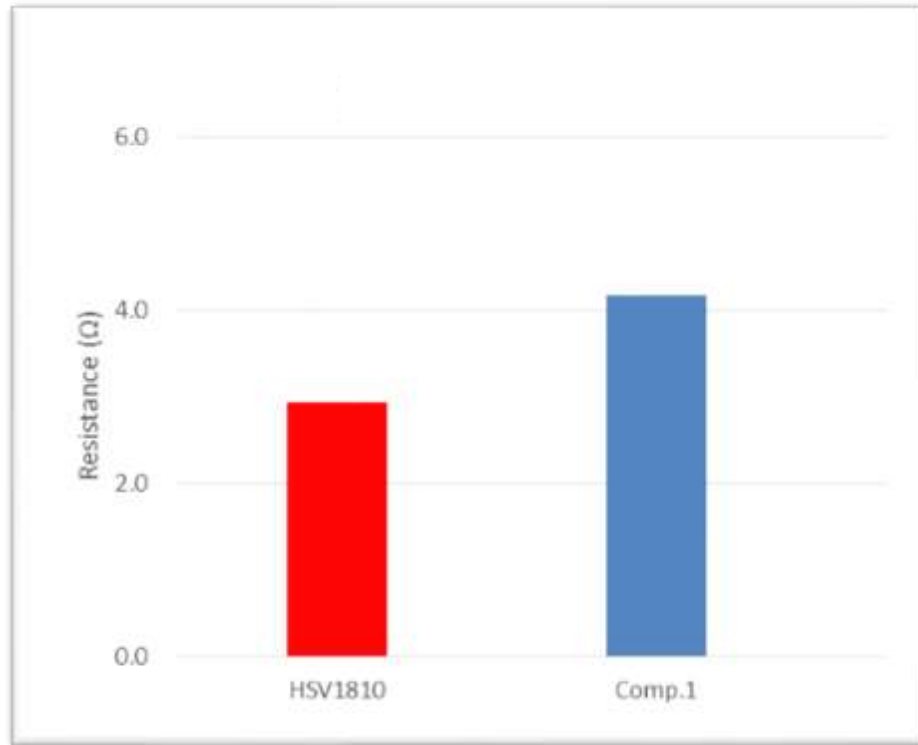
**Kynar® HSV1810 grade has a better slurry flowability than Kynar® HSV1800 grade.**



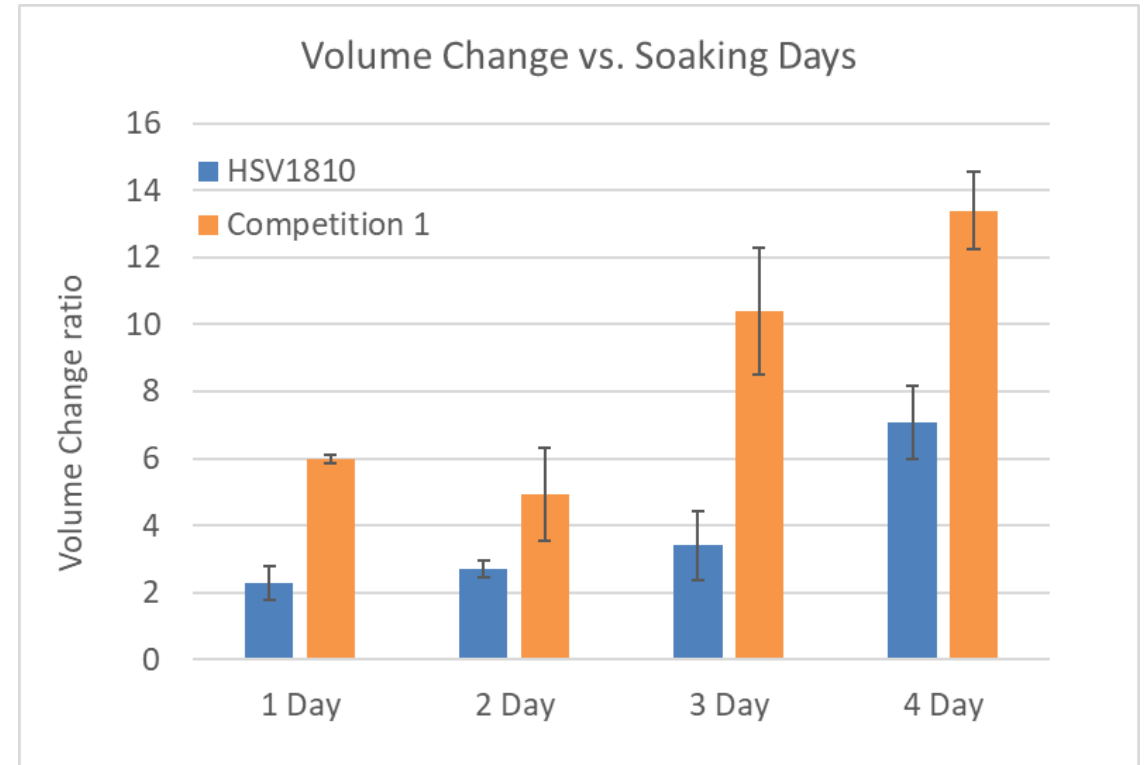
# KYNAR® HSV1810 – Electrode Resistance & Swelling

NMC622/CB/PVDF 97/1.5/1.5

## Average Electrode Resistance



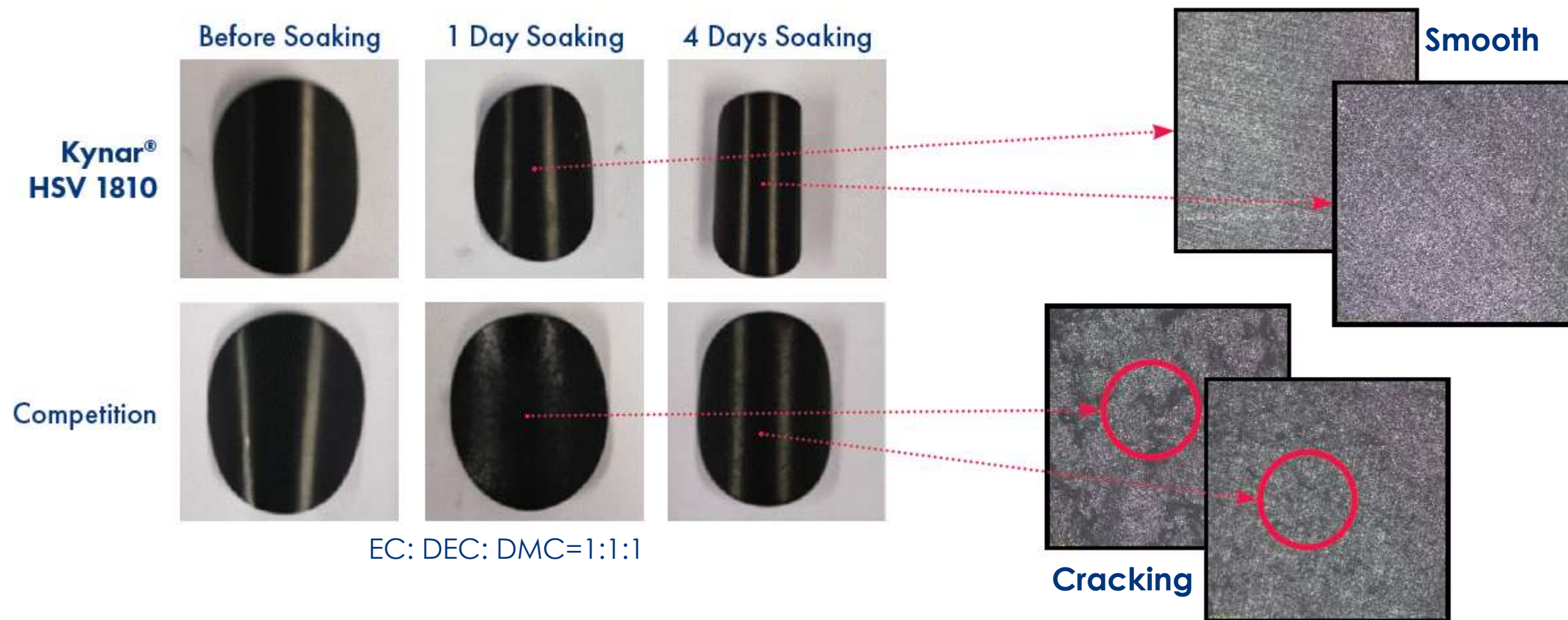
## Electrodes swelling



**Kynar® HSV1810 grade exhibits lower resistivity and swelling than competitor.**

# KYNAR® HSV1810 - ELECTRODE FLEXIBILITY

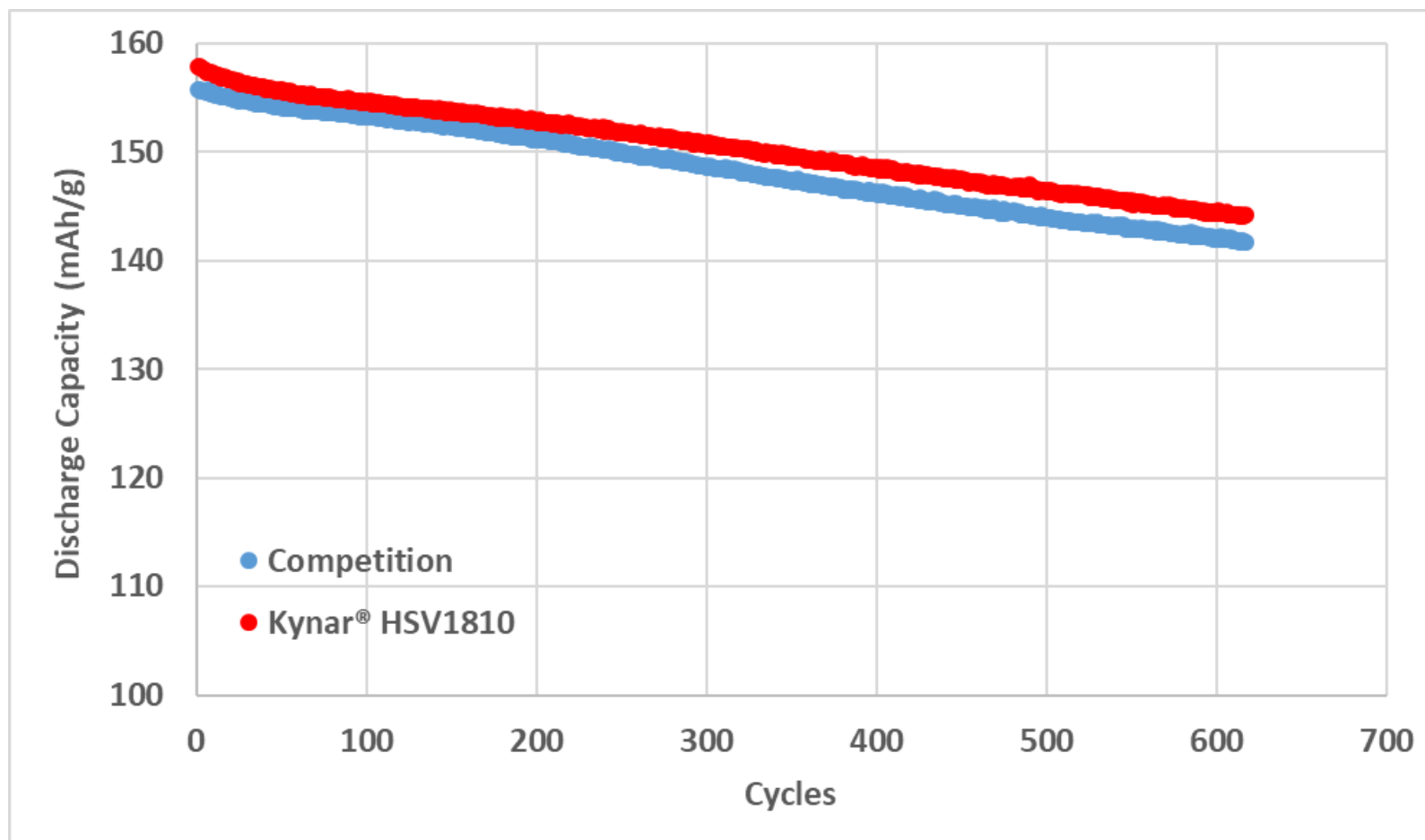
NMC622/CB/PVDF 97/1.5/1.5



# Cycling Performance (1C, 45°C) – Pouch Cell

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NMC622/Carbon/Binder=96/2/2



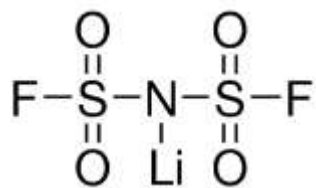




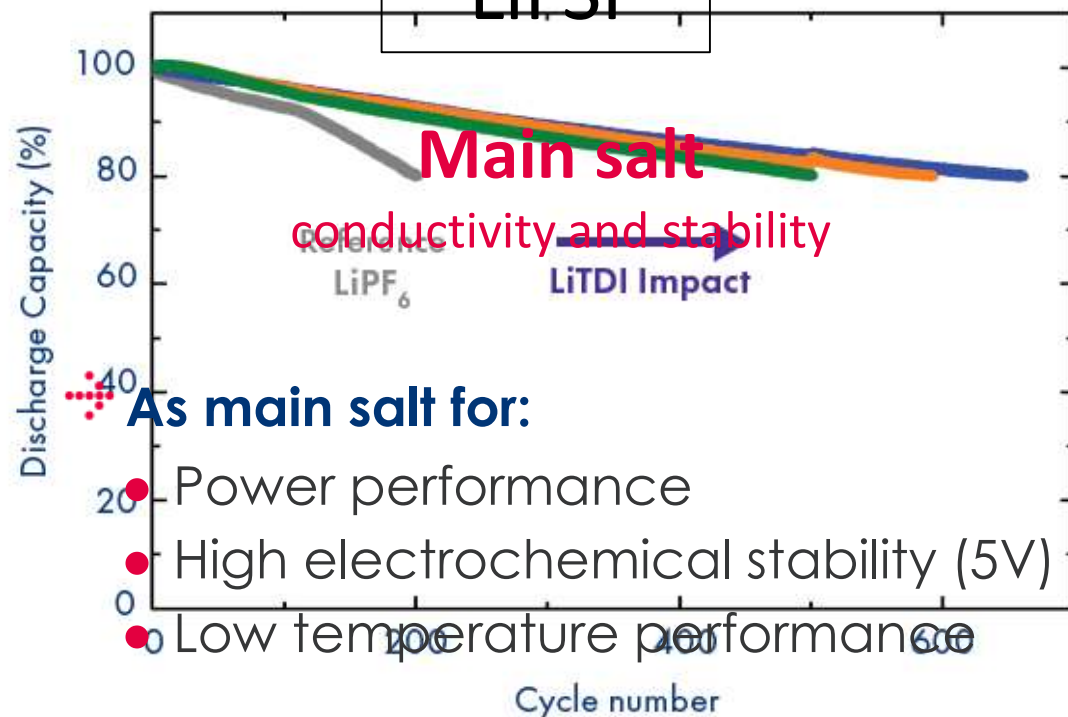
## FOCUS ON ELECTROLYTE SALTS



# DEVELOPING HIGH PURITY SALTS FOR HIGH PERFORMANCE

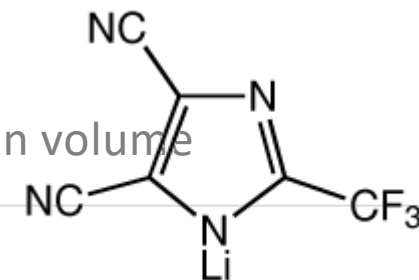


LiFSI

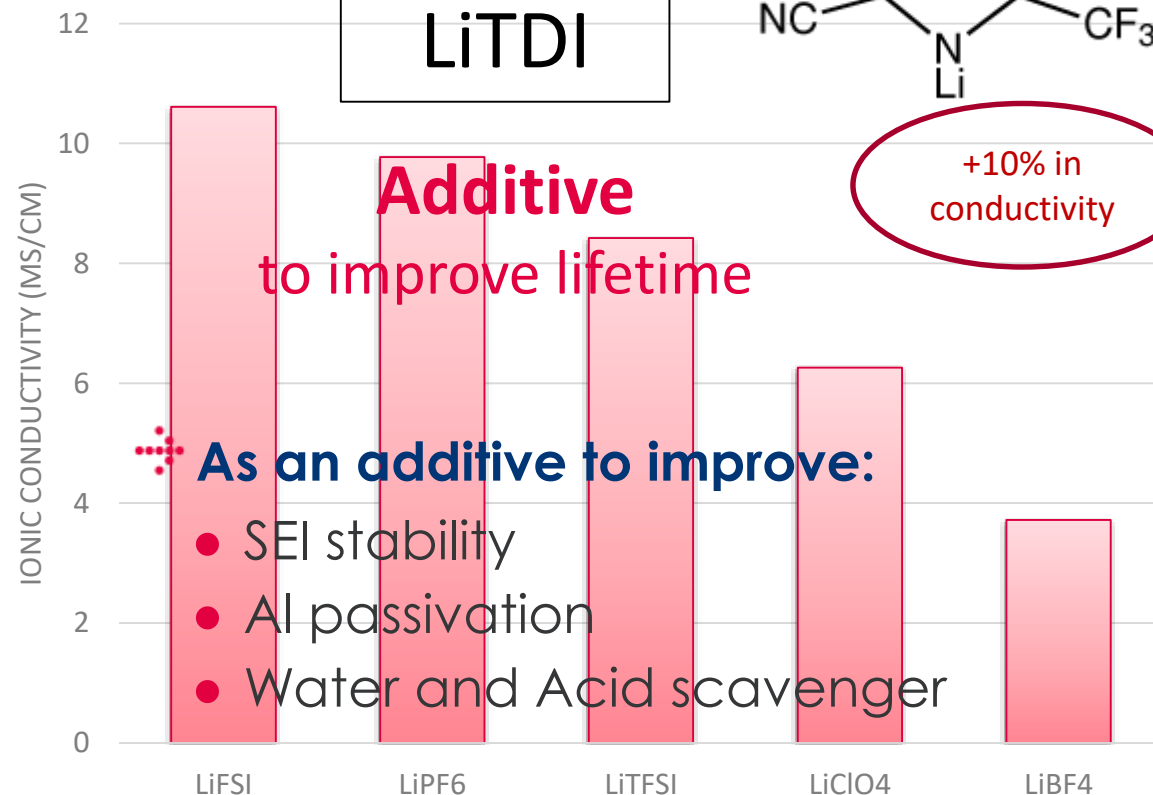


Salts in EC/EMC 3/7 in volume

LiTDI



+10% in conductivity





**#1 PRODUCER OF  
PVDF SINCE 1963**

**Industry knowledge and unique emulsion process allows enhancement of binder and separator coating materials**

- ✦ Enhanced binders **HSV-900, HSV-1800** and **new HSV-1810**
- ✦ Wide range of copolymer composition
- ✦ Leading supplier in separator coating

**Technology development from concept to commercialization resides in USA at the Global Battery Innovation Center**

**New Technology Programs include:**

- ✦ Waterborne technologies
  1. PVDF Anode
  2. PVDF cathode
  3. Separator coating
- ✦ Alternative electrolyte salts



# Thank you – Download our slides!

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