

Lithium Extraction from Unconventional Resources

Salman Safari, PhD, PEng



LITHIUM SUPPLY GAP



Source: RK Equity

RECION

CURRENT LITHIUM RESOURCES



Hard Rock Mining



Evaporation Ponds

High OPEX High carbon footprint >80% of refining occurs in China High CAPEX 18-month processing times Limited to regions with dry and hot climate Environmentally intrusive Low Li recovery (<50%) Cutoff: >500 ppm Li



THE OPPORTUNITY

\$100B+ Lithium reserve in unconventional brines

Geothermal, oilfield, etc.

Faster and less carbon intensive processes are needed

Direct lithium extraction (DLE) processes are the most promising technologies





TECHNOLOGIES

LiCl molecule in brine physically adsorbed onto sorbent and removed with strip solution. Lit' ion in brine chemically absorbed into solid ion exchange material and swapped for other positive ion. LiQL or Lit' from brine. LiQL or Lit' from brine.	Adsorption	lon Exchange	Solvent Extraction
	LiCl molecule in brine physically	Li [*] ion in brine chemically absorbed	Liquid phase with adsorptive or ion
	adsorbed onto sorbent and	into solid ion exchange material and	exchange-type properties removes
	removed with strip solution.	swapped for other positive ion.	LiCl or Li' from brine.

Jade Cove Partners. 2020

TRL9

TRL7-8

TRL6-7

PREVIOUS WORK

Developed the base DLE for **E3 Lithium E3** has market capitalization of >\$150M and has raised >\$20M to pilot the technology.



Livent and E3 Metals Announce Joint Development Agreement to Advance Lithium Extraction Process and Technology

09/18/2019

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PHILADELPHIA, Sept. 18, 2019 /PRNewswire/ – Livent Corporation (NYSE: LTHM) is pleased to announce a collaboration with E3 Metals Corp. (TSXV: ETMC) ("E3 Metals") whereby the two companies will seek to advance the development of E3 Metals' proprietary direct illihium extraction process. Work under this agreement will focus on E3 Metals' petro-Iltihium brines located in the Leduc Formation in Alberta, Canada.

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News

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Imperial and E3 Lithium form strategic agreement on lithium pilot project in Alberta

June 23, 2022

Advances E3 Lithium's Clearwater Project with Imperial funding contribution

 Pilot project progresses commercialization of battery-grade lithium from historic Leduc field for electric vehicles and energy storage



Recion's process

Brine with 0.005% lithium and 20% impurities





Lithium concentrate, sent for polishing/production



Batteries



- >90% Li extraction with a novel, robust ion exchange process. (WO2021212214A1)
- High lifetime of the sorbent.
- Compatible with hot, challenging brines (brine temperature as high as 80 °C).
- Unlocks low grade resources (Li as low as 20 ppm).
- Sorbent manufacturing scaleup by a commercial manufacturer.



History and development of Recion



Recion: A Sustainable Approach to R



Li concentration: 40-400 mg/L

Projects Highlights

Lithium extraction from low grade brine (bench)

Li	В	Na	Mg	К	Ca
30	>80	>1,000	>50,000	>1000	>20,000

values in ppm

>90% extraction,

0.5 L brine



Li/B 62 Li/Na 200 Li/Mg 4157 Li/K 300 Li/Ca 1060

Lithium extraction from Canadian oilfield brine (Lab pilot)



>95% extraction

Li/B	10
Li/Na	500
Li/Mg	43
Li/K	191
Li/Ca	57

RECION

Recion's Competitors

	HIGHLY LI SELECTIVE	DLE SORBENT IS ROBUST	SMALL FOOTPRINT	HOT BRINE OPERATION
Lilac Solutions		?		?
International Battery Metals		Ø	?	I
Summit Nanotech	?	?	?	
Recion	Ø	I	Ø	Ø





SALMAN SAFARI, PhD, PEng

Cofounder



DANIEL ALESSI, PhD

Cofounder





Contact Us!

salman@reciontechnologies.com

We are looking for partnership!

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