

COMPANY PROFILE

Gujarat Fluorochemicals



OUR BUSINESSES



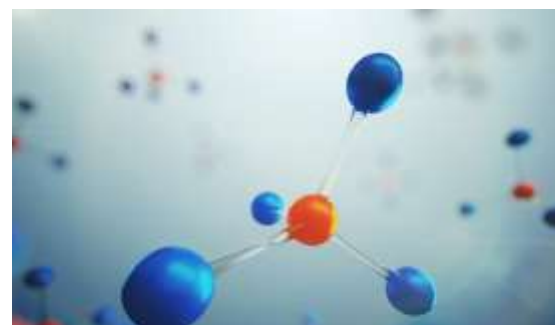
FLUOROPOLYMERS



FLUOROSPECIALITIES



REFRIGERANTS



CHEMICALS

MANUFACTURING

DAHEJ, GUJARAT, INDIA



Fluoropolymers,
Fluoroelastomers & Chemicals

RN, GUJARAT, INDIA



Fluorospecialities &
Refrigerants

JT HILLS, MOROCCO



Fluorspar Mining &
Beneficiation

FLUOROPOLYMERS BRANDS

INOFLON[®]
PTFE | FEP | PFA

FLUONOX[®]
FKM

INOLUB[™]
FLUOROPOLYMER ADDITIVES

INOFLAR[™]
PVDF



GFL interests for Li Battery market



1. **Inoflar™ PVDF binders** for Li- Battery Electrodes – Commercially available
2. Indigenous Manufacture of **Lithium Hexafluorophosphate LiPF_6** required as Electrolyte component in Lithium ion Batteries.
3. Manufacture and supply, initially by 2023, customized **LiPF_6 based Electrolyte formulations** as per Customer's recipe from our state of the art formulation facility, and eventually develop our own proprietary electrolyte formulations as performance products.



INOFLAR™ PVDF Portfolio



Inoflar™ Grade	Form	Melting Point (ASTM D3418)	Melt Viscosity (ASTM D3835)	Melt Flow rate (ASTM D1238)	MFR Load	Process/Application							
		°C	K Poise	g/10 min	kg	Compression	Transfer Molding	Injection Molding	Coating	Extrusion	Wire & Cable	Membranes	Li Battery
1005	Pellet	165 – 172	4 – 8	19 – 35	3.8		✓	✓		✓	✓		
1011	Pellet	165 – 172	8 - 12	10 – 18	5		✓	✓		✓	✓		
1020	Pellet	165 – 172	15 – 23	1.5 – 3	5	✓	✓	✓		✓	✓		
1125	Powder	165 – 172	23 – 29	2 – 6	12.5							✓	✓
1150	Powder	156 – 165	45 – 55	<0.2	21.6								✓
5125	Powder	165 - 170	23.5 – 29.5	2 – 6	12.5				✓				
Please refer product TDS(s) for detailed specifications													



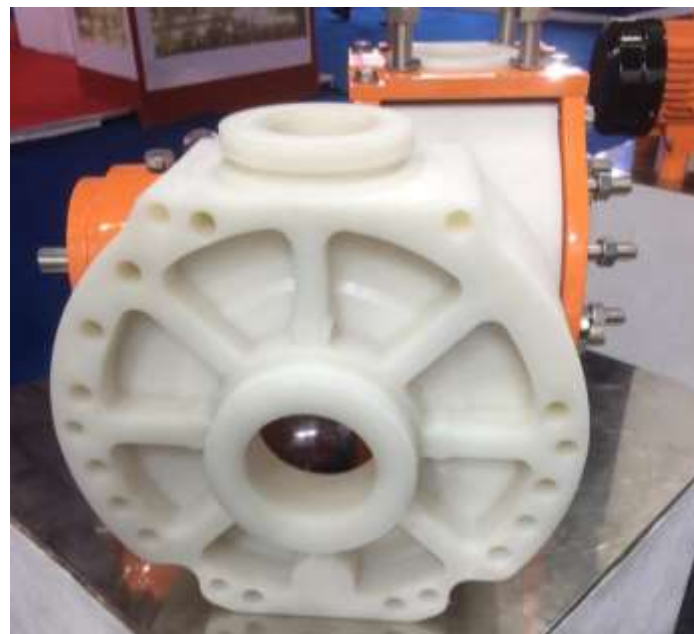
INOFLAR™ PVDF End Use Products



**Inoflar™ 1005
Valve Component**



**Inoflar™ 1005
Impeller**



**Inoflar™ 1005 Pump
@ ChemTech World expo 2019**

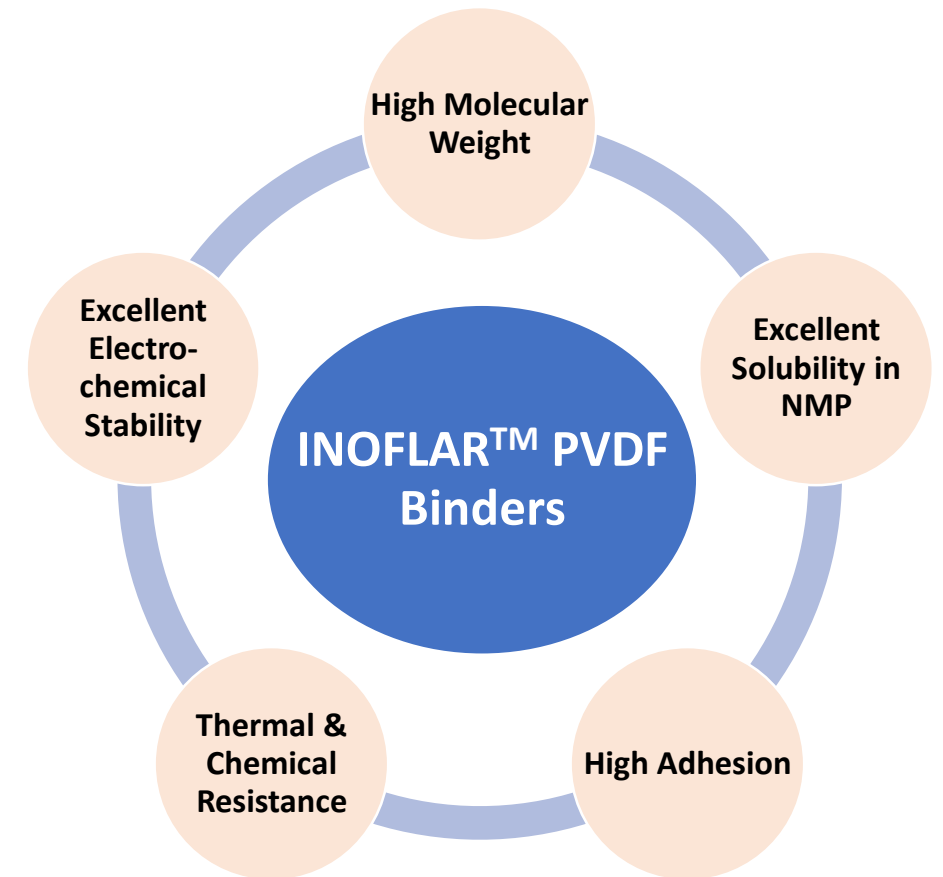


**Inoflar™ 1020 Pipe Vs
PVDF Sheet from
leading competitor**

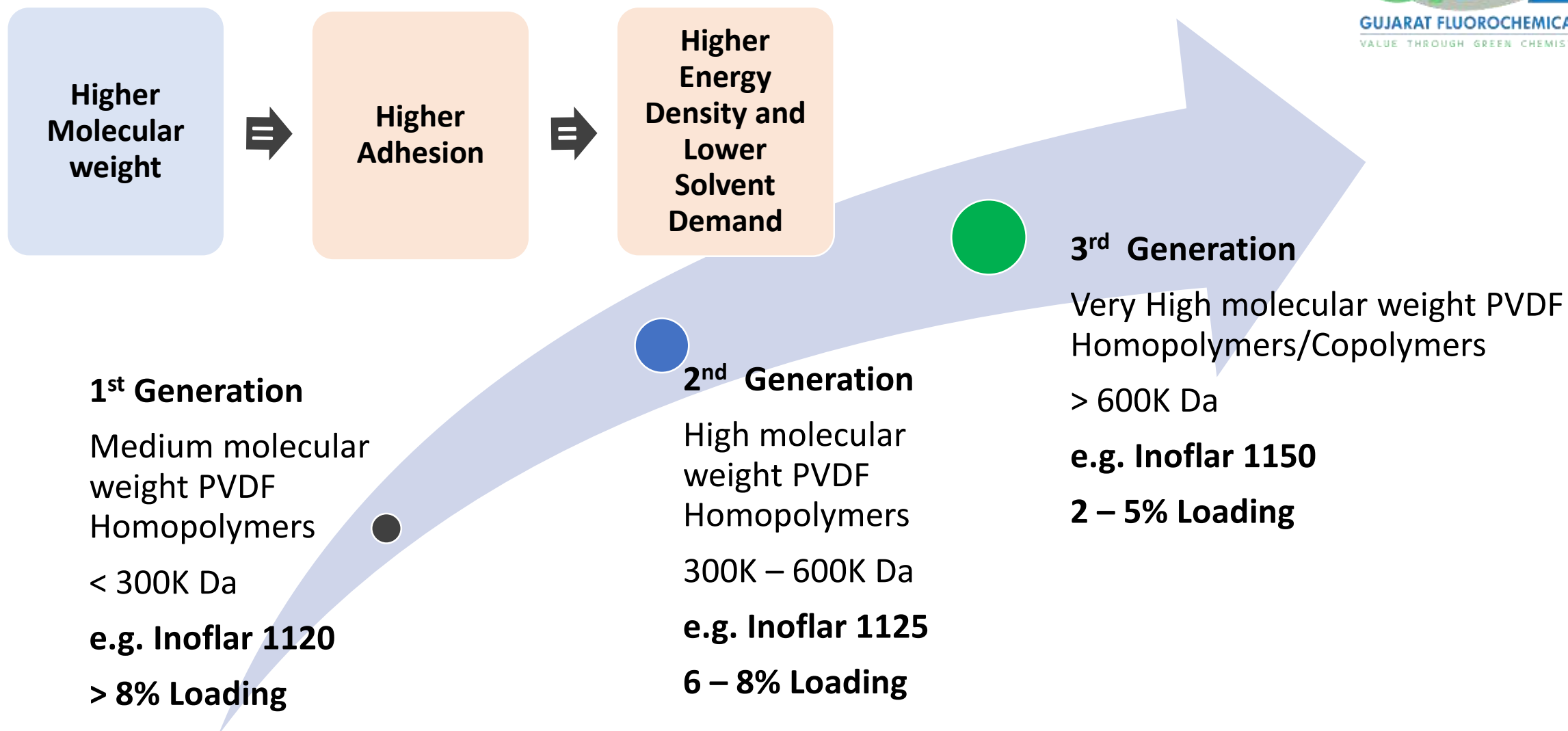


INOFLAR™ PVDF Binders

- Lithium batteries demand long-term reliability as well as chemical and electrochemical resistance in the specific chemical environment of Li-ion cells
- PVDF is electrochemically stable in the full range of voltage between 0 and 5 V vs Li⁺/Li
- PVDF is stable at high temperatures
- Compatible with most cell chemistries – NMC, LFP, LCO etc.
- Excellent solubility in polar solvents like NMP



Evolution of PVDF Binders



Li Ion Battery

- Key components of cell:

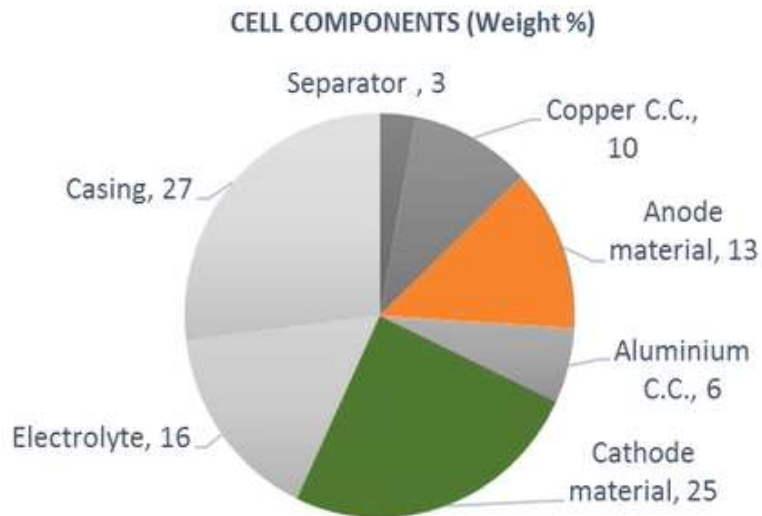
Anode

Separator

Electrolyte

Cathode

It is a mixture of lithium salt in an organic solution. The salt used is LiPF_6 .



GFL's Plan: LiB Electrolyte and Electrolyte Formulations



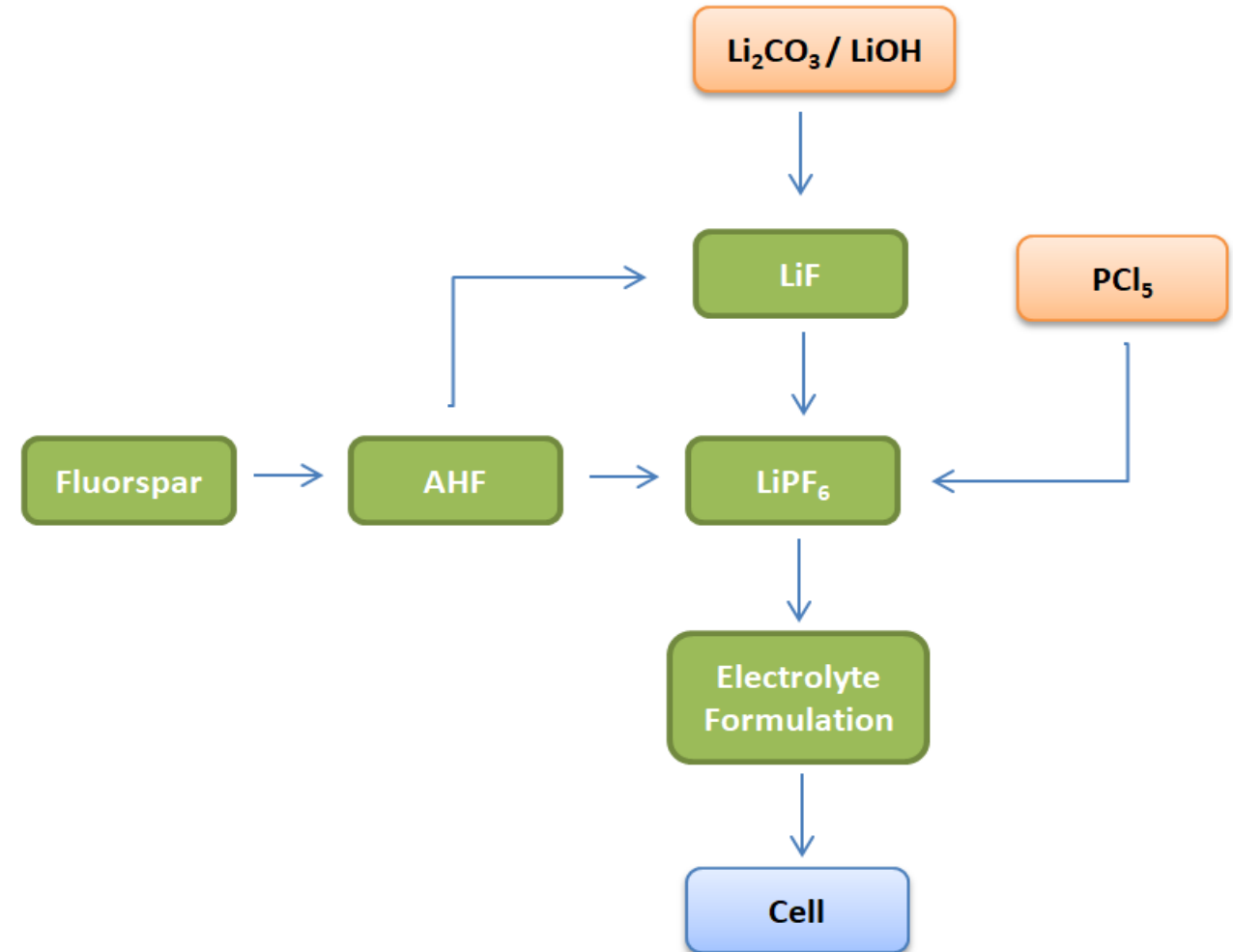
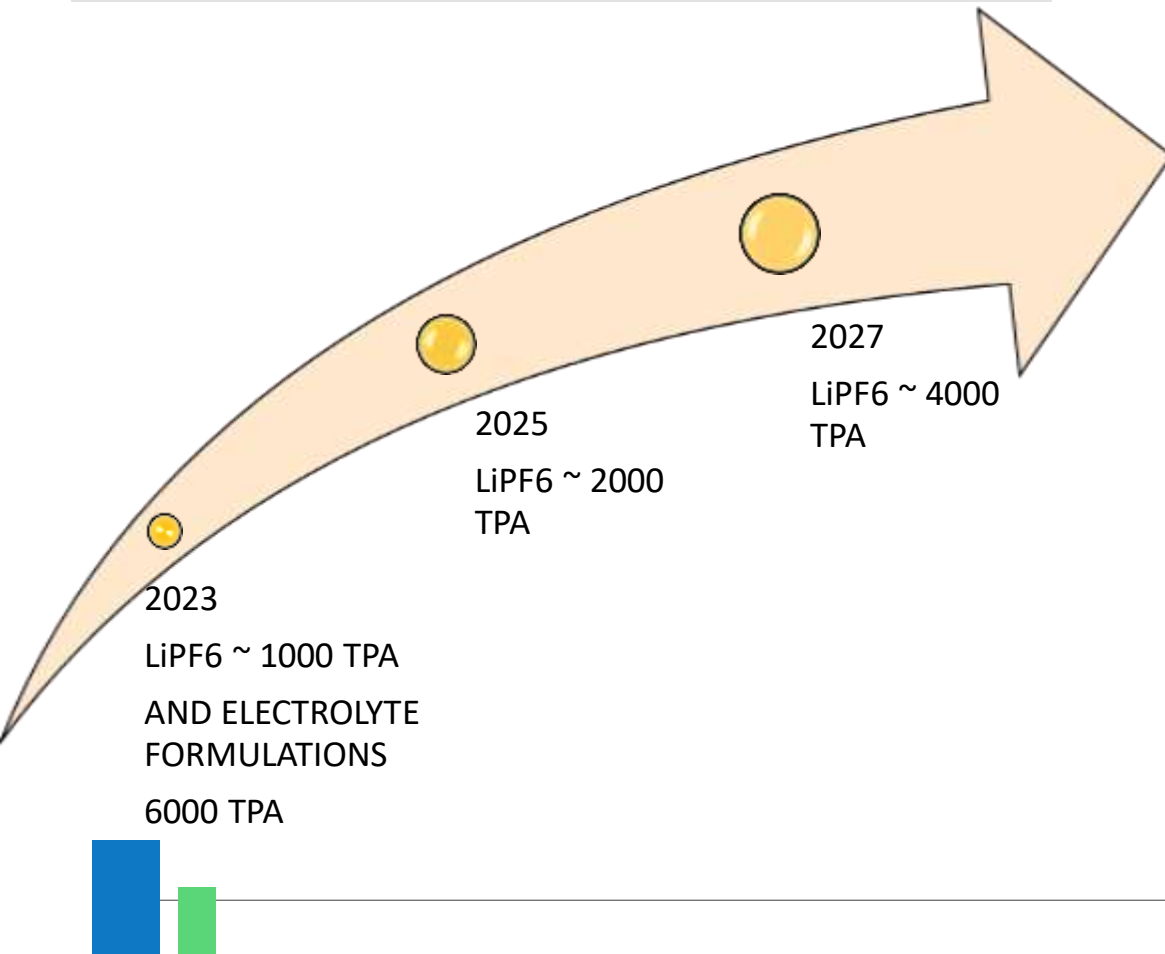
- GFL has Plan under implementation to set up a scalable plant to produce 1000 TPA Electrolyte grade LiPF_6 by end 2022 at Dahej, Gujarat.
- The plant will be scalable to expand to 2000 TPA by end 2024 and further to 4000 TPA if need be.
- GFL has been in Fluorine Chemistry for past three decades and has Technology for making Electronic Grade Anhydrous HF (AHF). Electronic Grade LiF will be made in-house starting from $\text{Li}_2\text{CO}_3/\text{LiOH}$
- A State of the art facility to manufacture about 6000 TPA Electrolyte formulation will be set up in the year 2023 which will enable us to service our Customers with customized formulations as per their needs. This will be fully equipped with Testing facility for stringent Quality Control



INTEGRATED OPERATIONS and LiPF_6 and Electrolyte Formulations: GFL'S TIME PLAN



- 30+ years of expertise in Fluorine chemistry
- Our own fluorspar mines in Operation
- Electronic Grade AHF manufacturing Capability



GFL Advantage



GFL Advantage

- **4th Largest Fluoropolymer manufacturer in the World and Largest in India**
- **Expertise in Fluorine Chemistry**
- **Vertically integrated operations**
- **Advanced R&D facilities**

Emulsion Technology

- **Easier and Faster Dissolution in Solvents**

Made in India

- **First and only PVDF manufacturer in India**
- **Capability of indigenous manufacturing of other Key Li battery raw materials like LiPF_6**

THANK YOU

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