

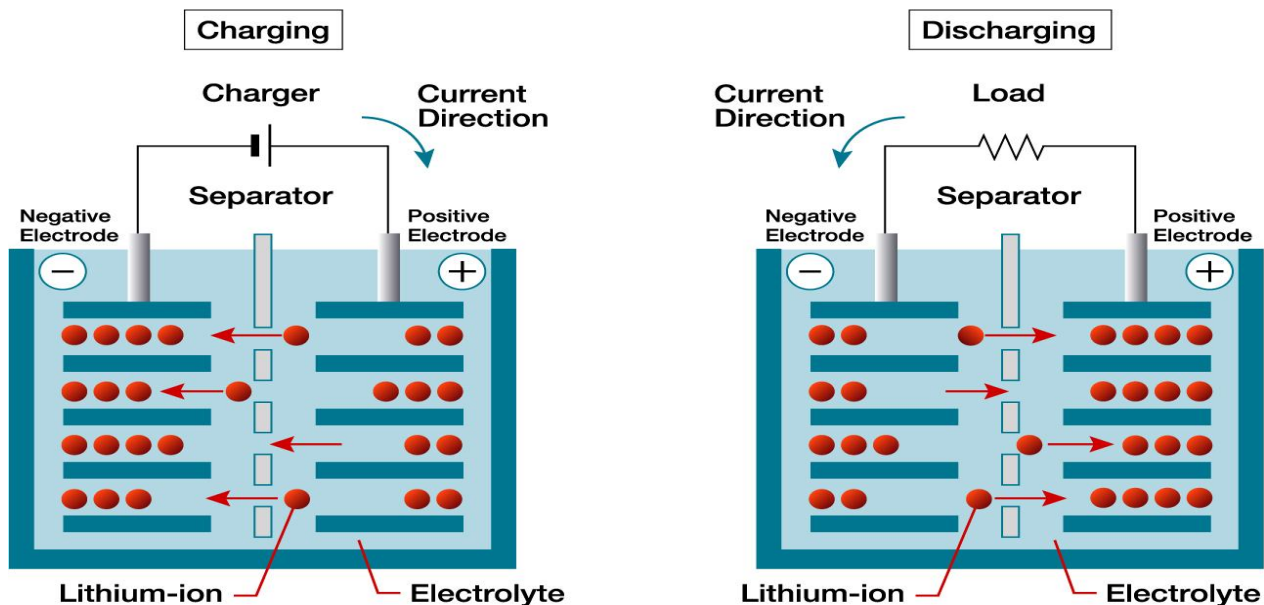
Battery Separator film making business.

For a common man is it difficult to make a Car or a Scooter / Bike.

And so, entrepreneurs can think of making Battery Separator film and coat it.

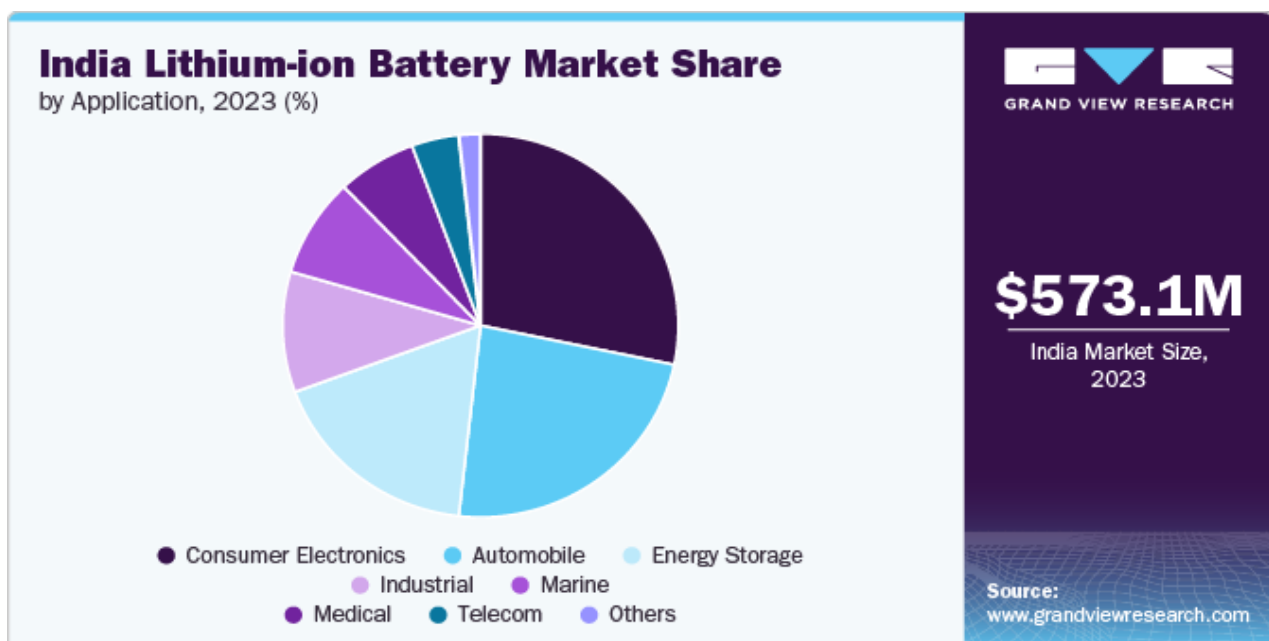
One of the most critical components for battery safety is the separator, which is a thin, porous membrane that physically separates the cathode from the anode.

What a battery Separator is? Can see the picture as hereunder and can understand easily.



Why this business?

- The India lithium-ion battery market size was at about USD 573.07 million in 2023 and expected to expand at a CAGR of 38.7% from 2024 to 2030.
- Increasing adoption of Electric Vehicles (EVs) and the ongoing integration of wind and solar energy sources into power grids.
- Significant demand for energy storage solutions. AND
- Supportive government policies



Whom to sell?

- **CONSUMER ELECTRONICS:** IoT Devices Wearables Cell Phones Tablet and Personal computer UPS Others
- **Automobile:** Passenger vehicles Commercial vehicles Electric vehicles E-bikes E-Scooters Electric forklifts Automated Guided Vehicles (AGVs) E-Cars Others
- **Energy Storage:** Military & Defense Communication devices Armored vehicles UAVs Weapon systems
- **AND Some more like:** Marine Medical Industrial Telecom Others

Battery Separator is a polymer film commercially is made up of Polyethylene (PE), polypropylene (PP), or hybrids of PE and PP. A 12 μm thick PE separator is, usually used as a substrate to deposit Al_2O_3 layers on each side of the separator using Electron beam Physical vapor deposition technique.



The major two types of polymers used to make Separators are UHMWPE and PP+PE/PP tri-layer film.

UHMWPE is robust & durable plastic with high abrasion, impact, and wear resistance.

It is of lightweight nature and resistance to chemicals.

It is odorless, tasteless, and nontoxic.

It is resistant to concentrated Acids and Alkalis, and many organic solvents.

It is highly resistant to corrosive chemicals.

It has extremely low moisture absorption and a very low COF (Co-efficient of friction) and is self-lubricating.

BUT. Polyolefin separators are dominant in lithium-ion batteries, with PP/PE/PP tri-layer separators being a common choice.

The PP/PE/PP tri-layer battery separator is a specialized composite membrane designed for use in advanced batteries.

PP forming the outer layers and PE the middle layer, this separator offers a unique balance of thermal stability, mechanical strength, and shutdown capability.

The high melting point of PP ensures structural integrity at elevated temperatures, while the lower melting point of PE allows for effective shutdown in the event of overheating, enhancing battery safety.

This tri-layer structure offers robust mechanical properties, chemical resistance to electrolytes, and optimal porosity, making it ideal for applications such as consumer electronics, electric vehicles, and energy storage systems.

COATING of the film:

There is organic coating (Alumina (Al_2O_3), boehmite) and inorganic coatings (PVDF, Aramid) for battery separators.

The Al_2O_3 layer on a separator film can vary in thickness, but commonly falls in the range of $4 \pm 1 \mu\text{m}$.

Ceramic coating can significantly improve the thermal shrinkage, oxidation resistance, and puncture strength of the separator and the wettability of the ceramic layer's porous structure.

Coating Process:

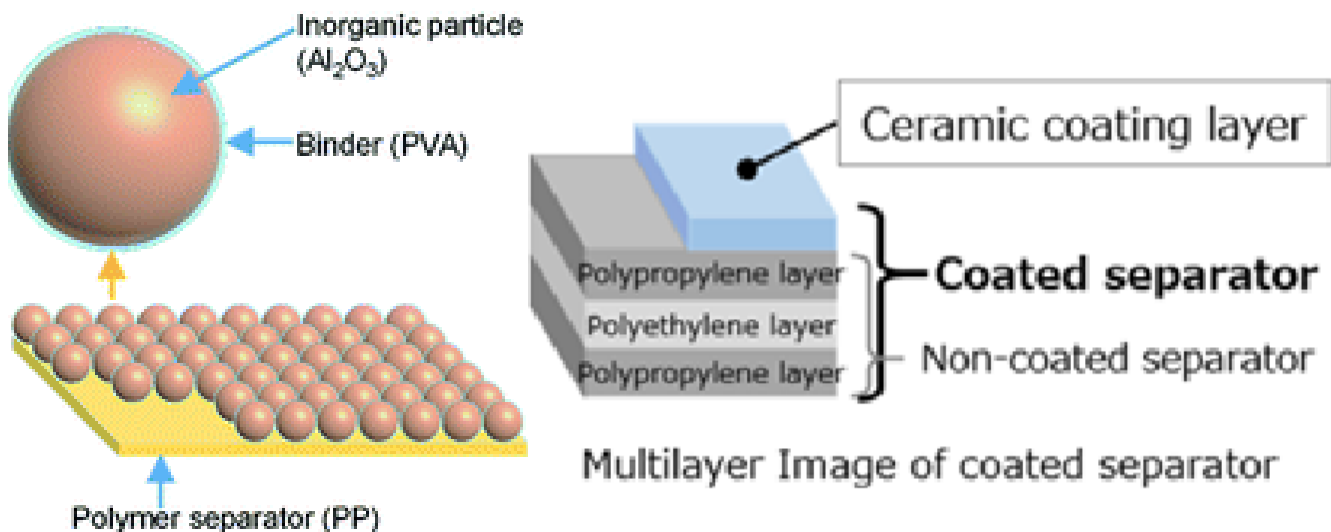
Step One : Make ceramic slurry with Al_2O_3 + PVDF

Step Two: The ceramic slurry will be printed on the surface of the PE or PP base films with the auto gravure printing machine

Coating Thickness:

A common range of layer thickness is $4 \pm 1 \mu\text{m}$ on a $12 \mu\text{m}$ polyethylene (PE) base film for a single sided coating.

A double-sided coating of $2 \mu\text{m}$ alumina is also done for superior thermal stability and electrochemical performance.



This is the best New Project for the people who wish no lousy competition or MORBI-RAJKOT effect in the business at all. This is a technical product and need educated class of the entrepreneurs to enter in to this project. Just few Partners cannot do this and so is much safer business to venture in to.