Lithium-Ion Battery Manufacturing

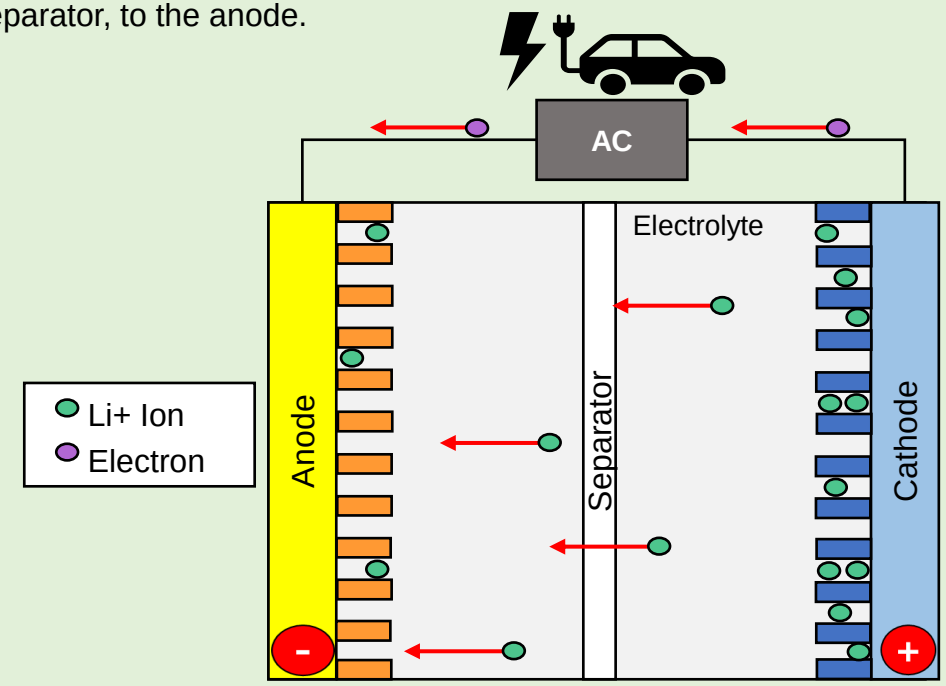
Process Overview

Lithium-Ion Battery – Basic Manufacture and Operating Principle

- A Lithium-Ion Cell consists of 4 major components: *Anode, Cathode, Separator and Electrolyte*
- Battery cells are connected in series and in parallel to provide higher voltage battery modules and packs
- Battery cells are combined to form battery modules for improved mechanical stability
- Modules are combined into a pack assembly, the battery management system and cooling system is added and the pack is fitted into an EV

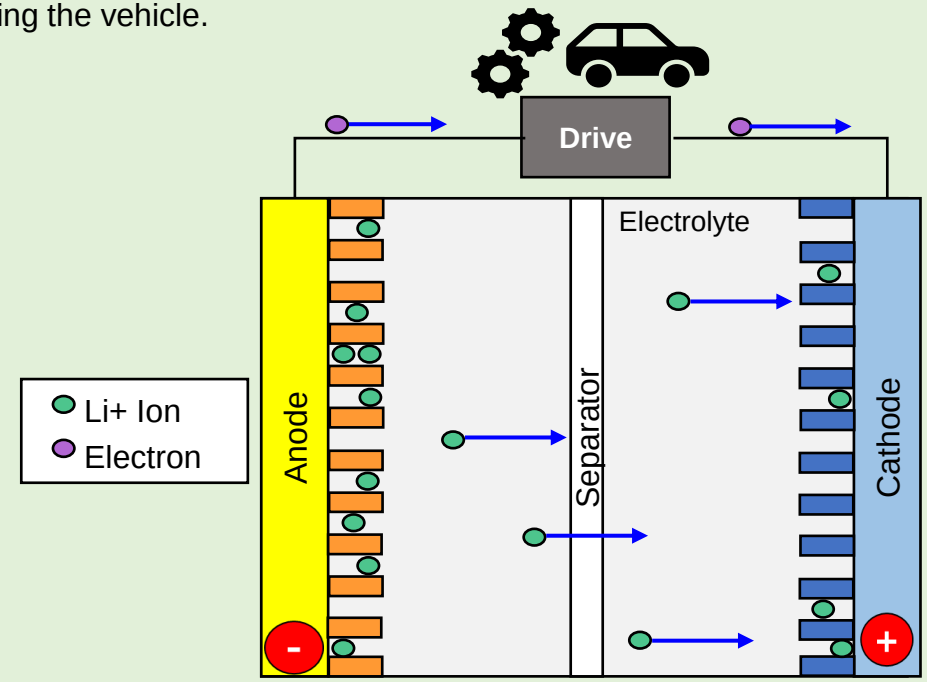
Charging

- During charging, the induced electric current releases the Li+ ions from the cathode, allowing them to flow back through the electrolyte and porous separator, to the anode.

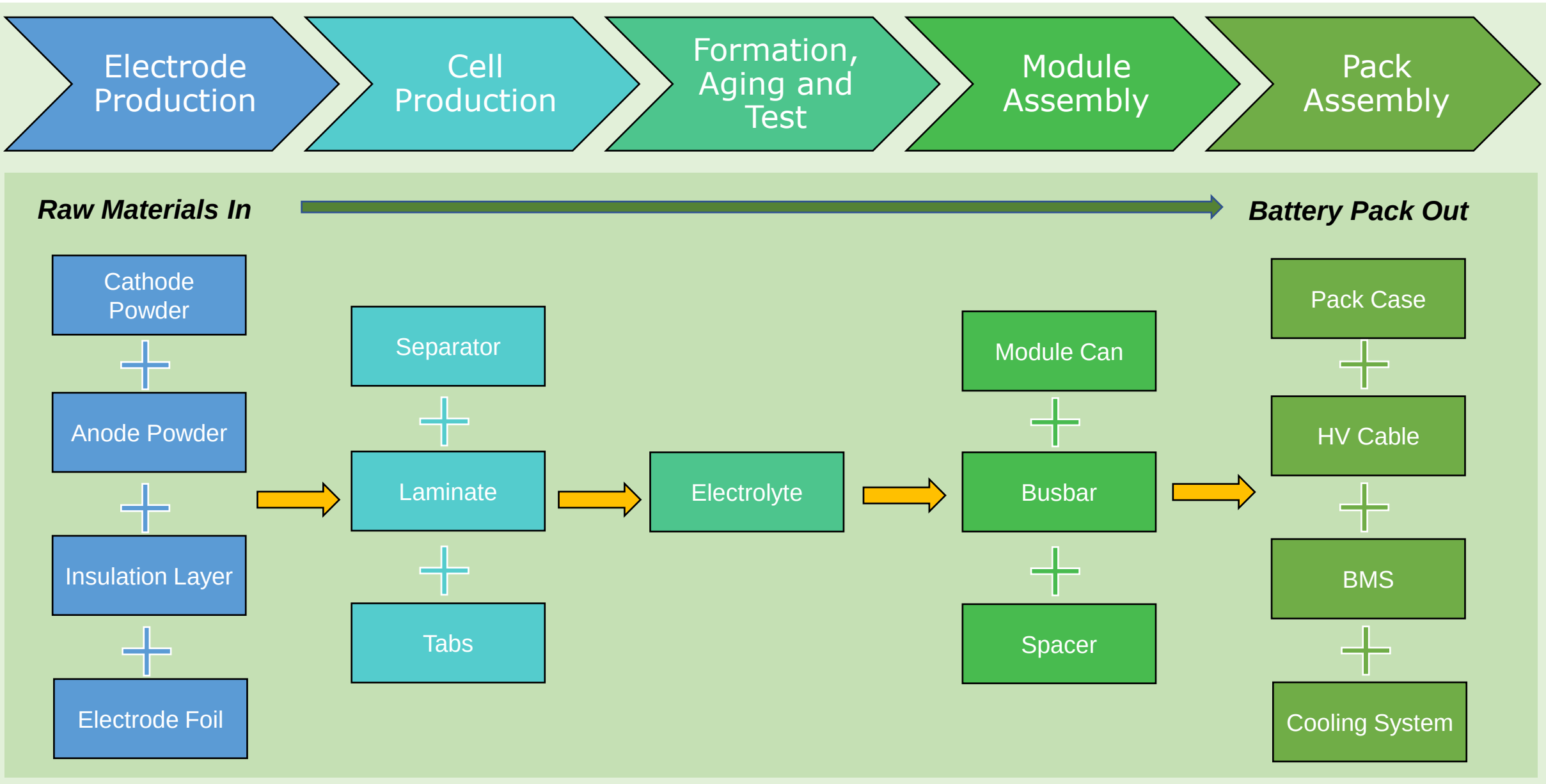


Discharging (Driving)

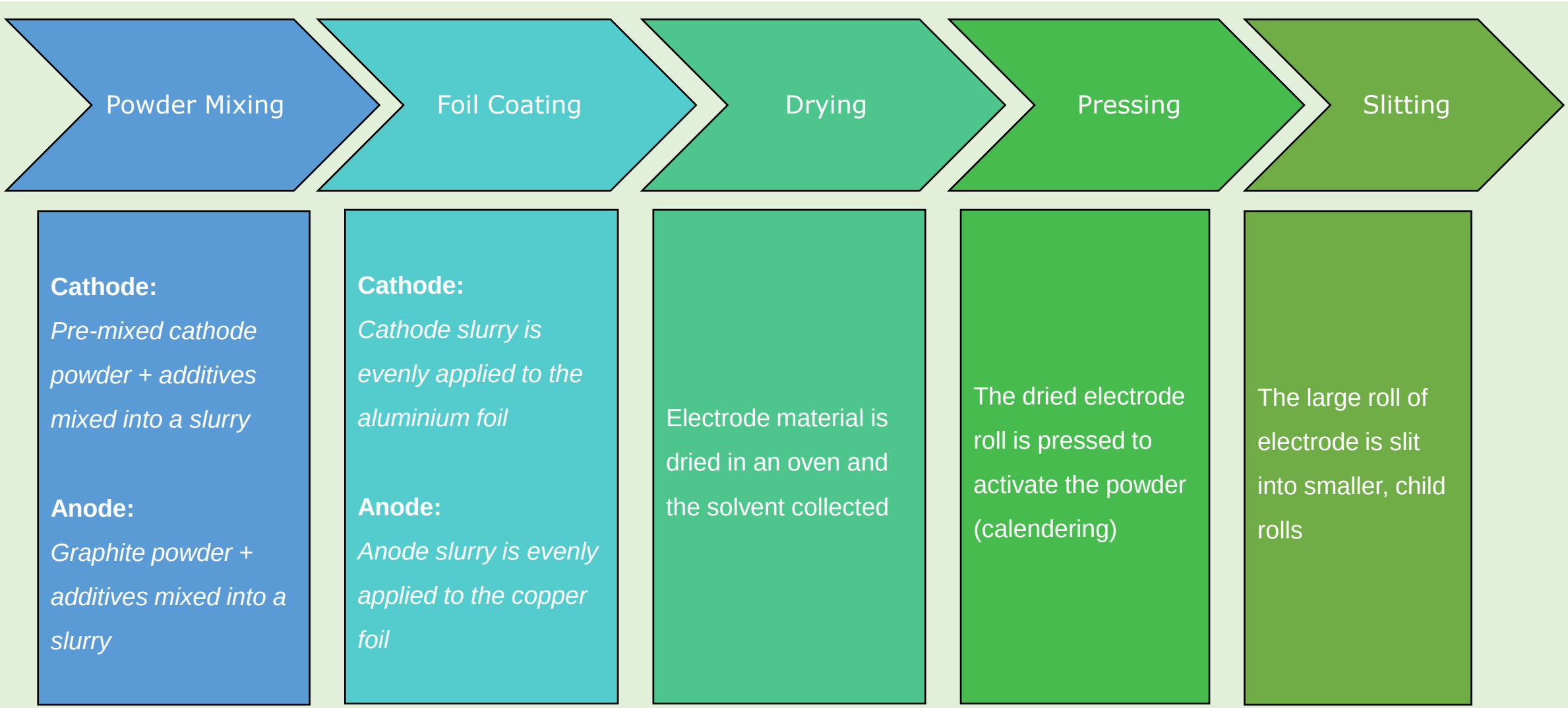
- During discharge, Li+ ions move from the anode to the cathode through the electrolyte and the porous separator, causing an electric current to flow, powering the vehicle.



Overall Process Overview

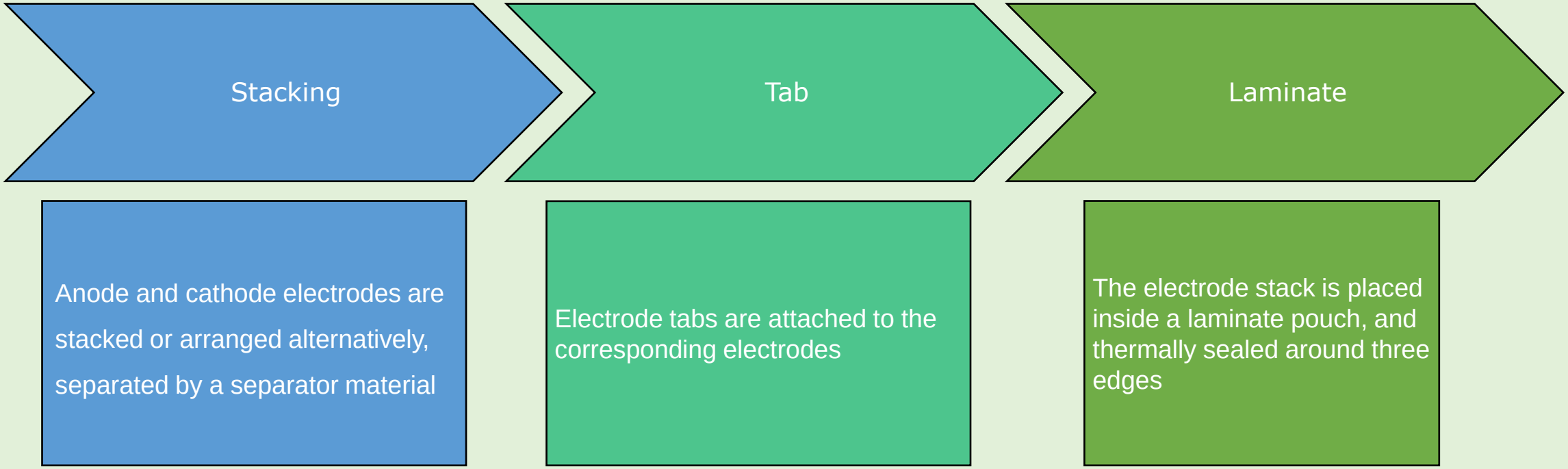


Electrode Production Process Overview



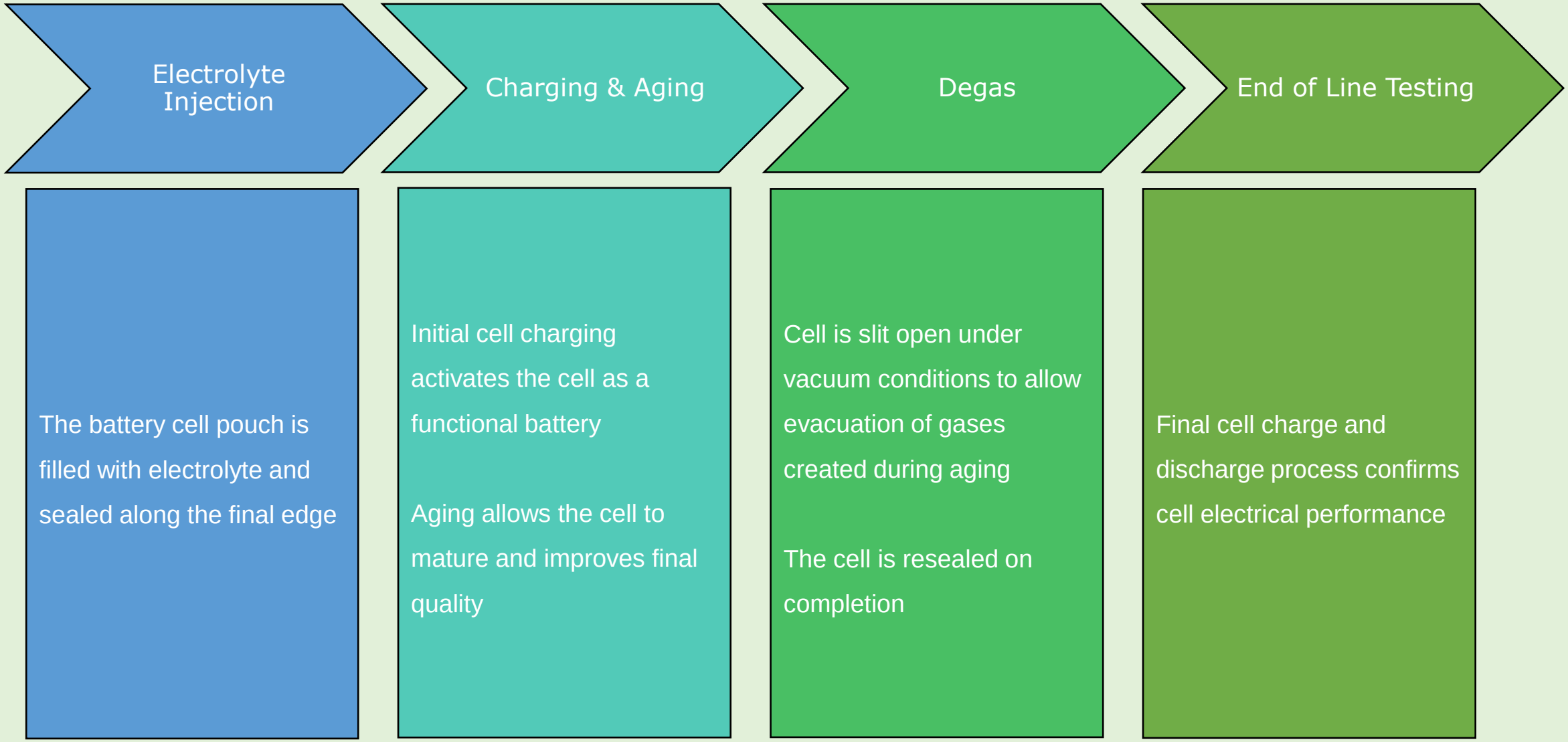
*Cathode and anode electrode manufacturing is completed in separate environments to prevent cross-contamination

Cell Production Process Overview



*Cell Production is completed in a clean, dry environment to prevent moisture interaction with cell components and particulate contamination

Cell Formation, Aging and Test Process Overview



Module Assembly Process Overview

- Cells are combined to form battery modules in order to increase mechanical stability and in preparation for pack assembly

Cell Preparation	Module Assembly	Canning	EOL Testing
Cells are prepared for stacking into modules Contact tabs are cut to size	Glue is applied to each cell to improve strength Cells are stacked and contact tabs welded in preparation for pack installation	Insulation is placed around the module stack for physical protection in service Cell stacks are secured in module housings	The completed module assembly undergoes final functional testing to confirm product quality, including : • Pressure / Leak test • Voltage check • Internal Resistance

End