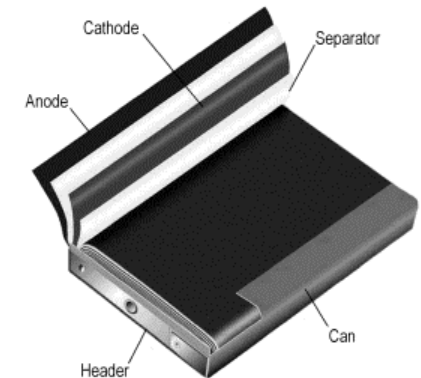


Basic Electrochemistry Li-Ion Cell

FIVE CELL COMPONENTS

Cathode: positive electrode ← Lithium Compound

- ↳ Saphion – (Valance)
- ↳ LiCoO_2 – (Most Common)
- ↳ or LiMn_2O_4 – (Moli)
- ↳ $\text{Li (Co+Ni, Mn, Fe) O}_2$ – (New Proprietary Blends)



Anode: negative electrode ← Carbon

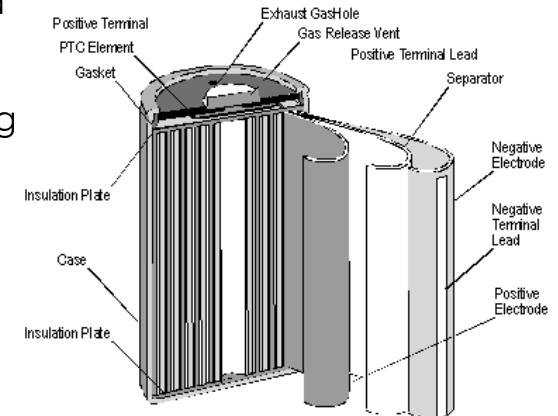
- ↳ Coke – (4.1 V max CV charge; old technology)
- ↳ or Nano Composites (new proprietary technology)
- ↳ Graphite – (4.2 V max CV charge; current technology)

Electrolyte: medium for transferring charge ← Proprietary organic compound

Separator: physical separation of electrodes but ← Polyethelene allows charge in electrolyte to flow

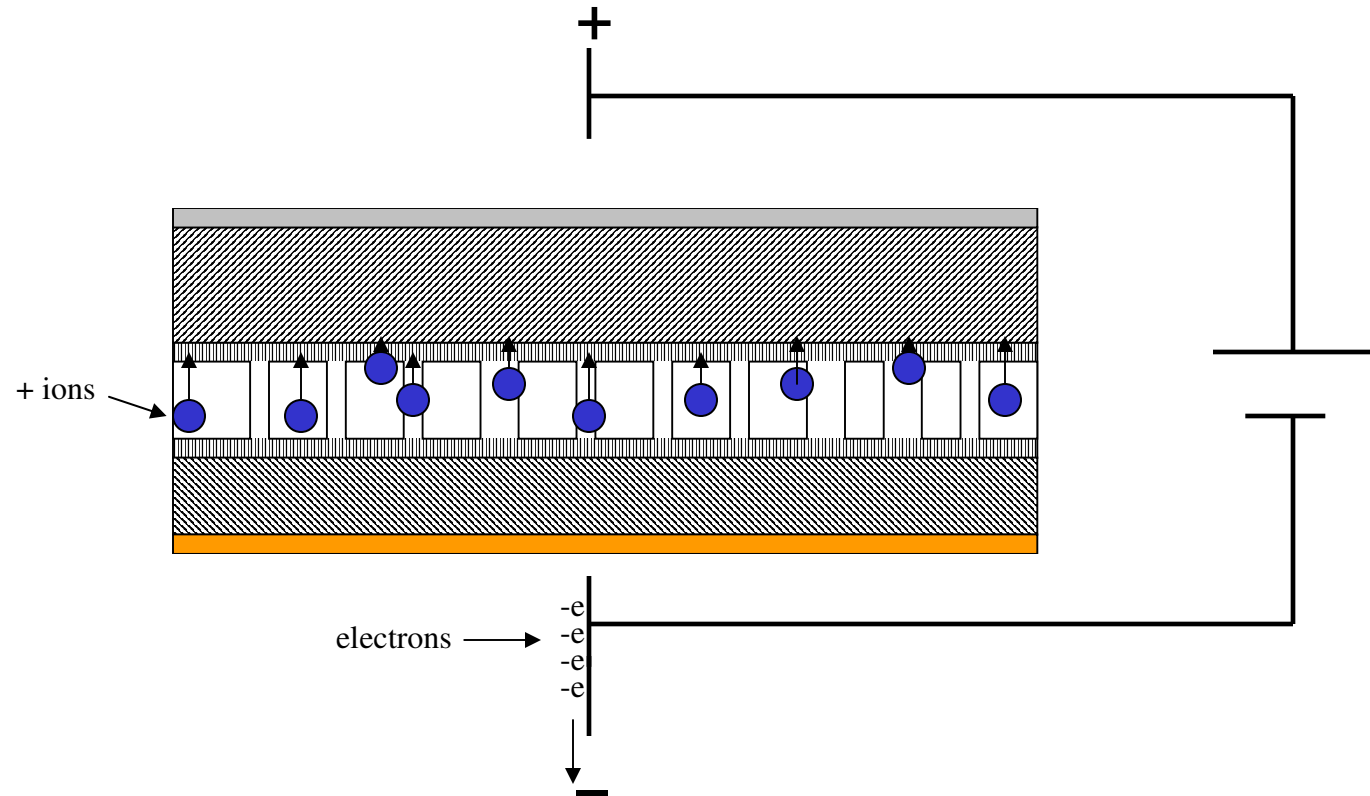
Container: case to contain active components ← or Foil (Polymer cells)

- ↳ Steel – Case (-)
- ↳ Aluminum – Case (+)



Li-Ion Cell During Discharge

Al foil
Cathode
Separator
Anode
Cu foil



Reaction Theory

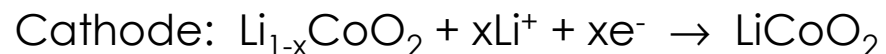
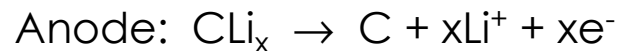
Discharge:

- Electrons travel through external circuit from negative to positive terminals powering external device;
- Li^+ ions are dragged through the cell separator to maintain electro-neutrality at the electrodes.

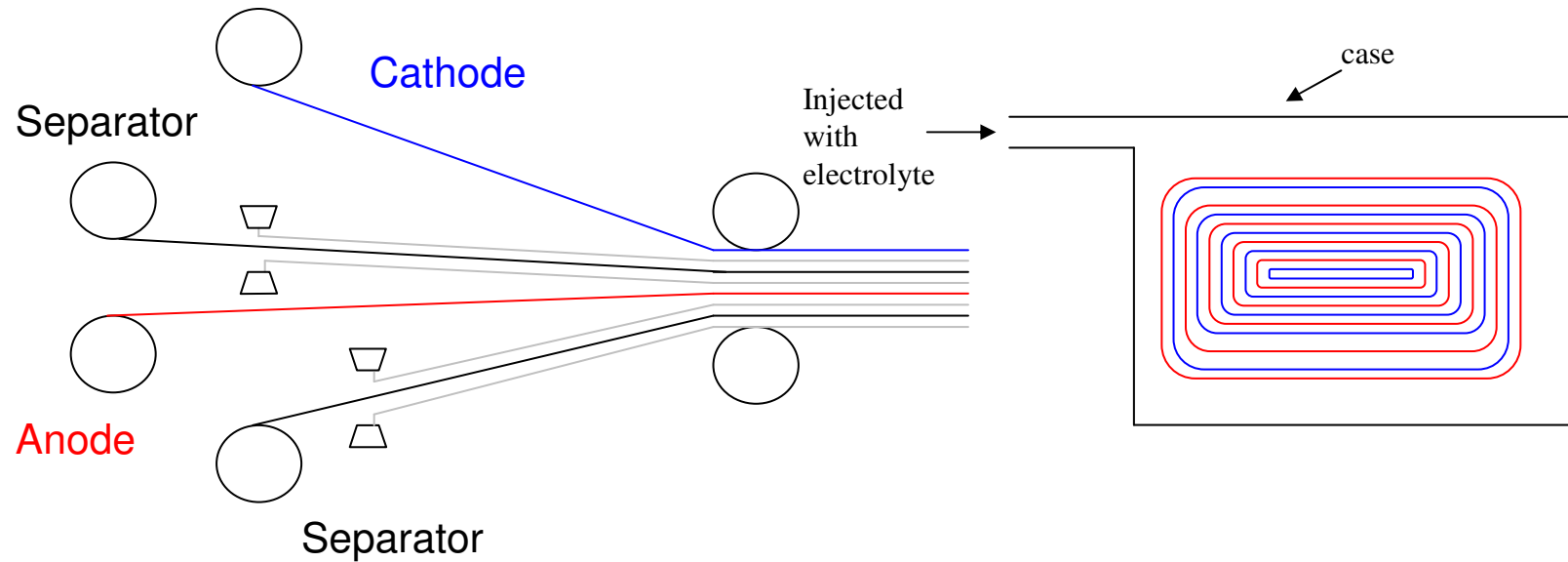
Charge:

- Electrons are pumped by the charger from the positive to the negative terminals
- Li^+ ions are once again dragged through the cell separator to maintain electro-neutrality at the electrodes.

Chemical Reaction (LiCoO₂ discharge example):



Li-Ion Cell Construction



Binder is coated onto separator for a Li-Ion Polymer cell

Conventional winding for both Li-Ion and Li-Ion Polymer