4. Supercapacitors, Ragone Plot

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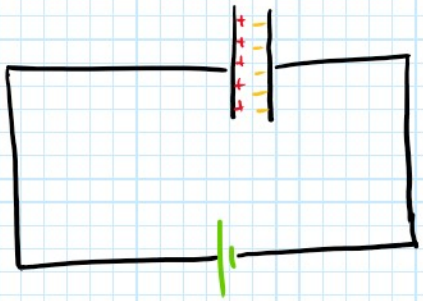
CAPACITORS



- High power density
- No redox reactions
- Storage in terms of μF
- Rapid charging and discharging

$$Q \propto V$$

$$Q = CV$$

C → capacitance

$$C \propto A \qquad C \propto \frac{1}{d}$$

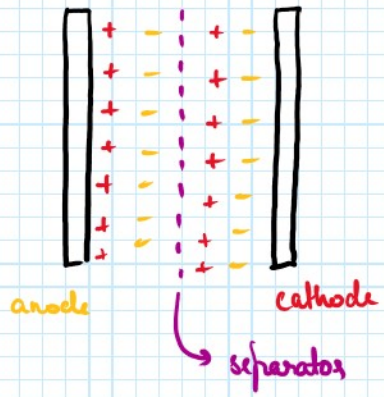
$$C = \frac{\varepsilon A}{d}$$

SUPERCAPACITORS

Also called ultracapacitors, EDLC

Electrical Double Layer Capacitor

- High power density
- High cycle life
- Safe
- Storage of electrical double
- No redox reactions
- Rapid discharging and charging



Anode: Porous carbon / graphene / carbon nanotubes

Cathode: Porous carbon / graphene / carbon nanotubes

Electrolyte: KOH / H_2SO_4 / Na_2SO_4

Separator: Polypropylene

Disadvantages

Applications

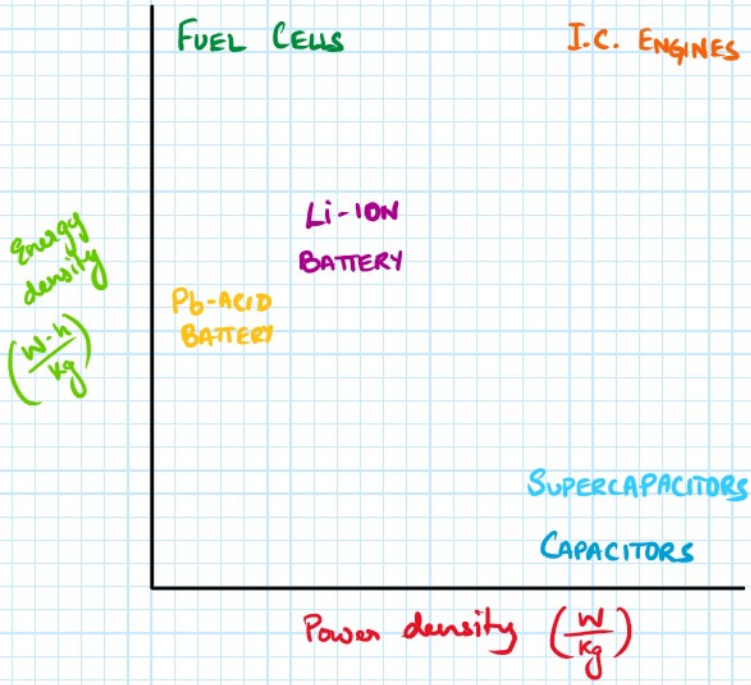
Disadvantages

- Low energy density
- Rapid discharging

Applications

- Hybrid cars
- Automobile industry

RAGONE PLOT



Supercapacitors: High PD, low ED