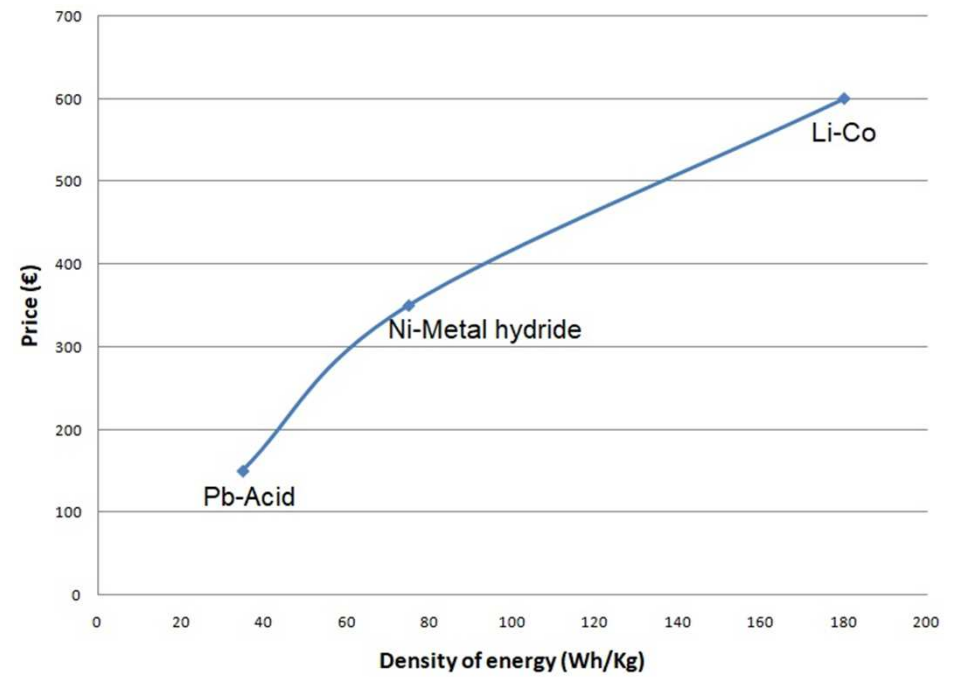
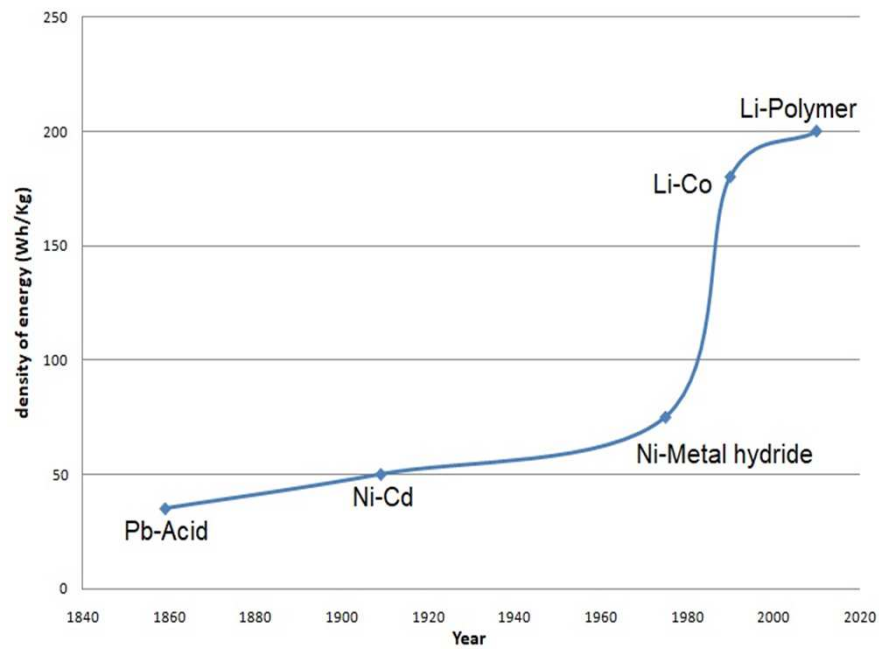


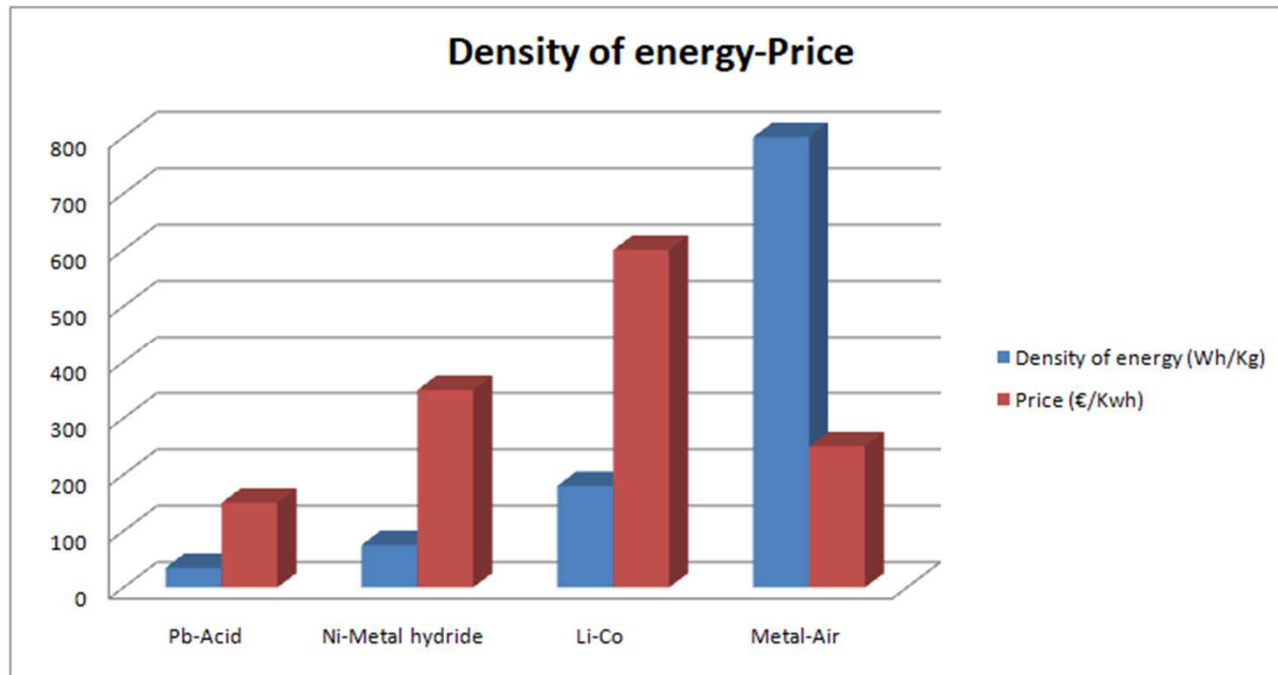
METAL-AIR BATTERIES

Marc Colom Rubio
Ivan Troncho Tena

A BIT OF HISTORY



A PROMISING FUTURE

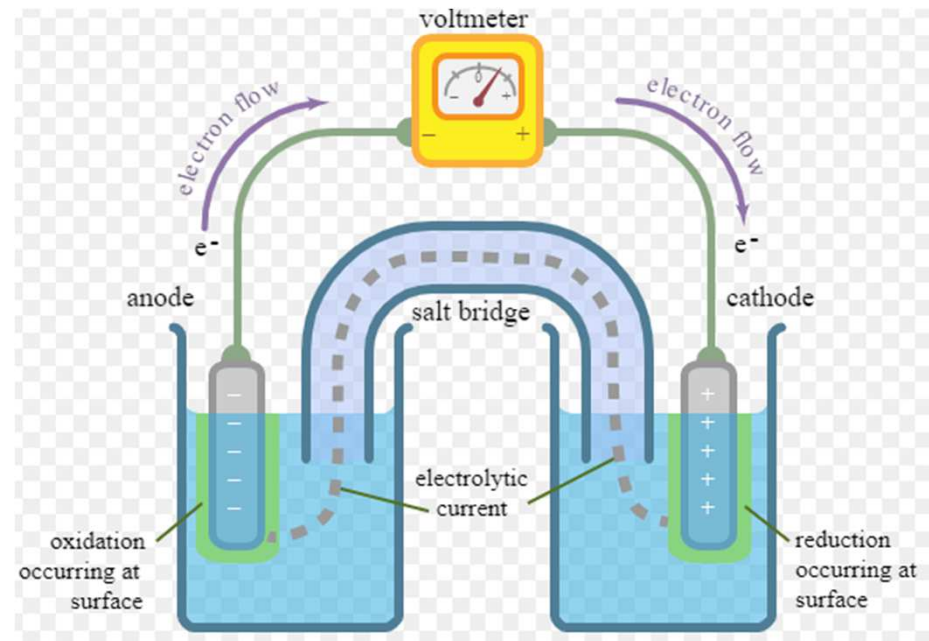


A FEW BASIC IDEAS OF ELECTROCHEMISTRY

-Redox reactions

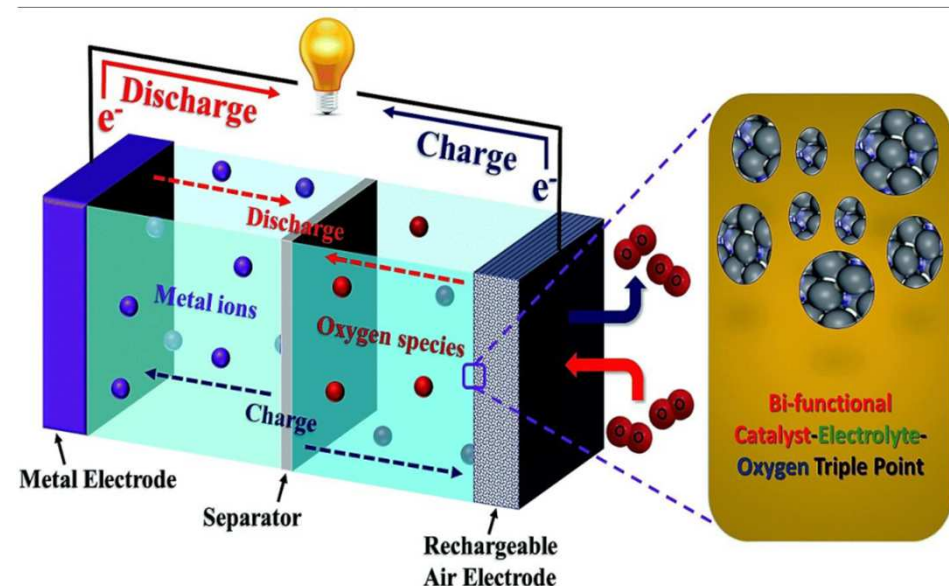
-Electrochemical cell

- Electrolyte
- Exchange membrane
- Electrode
- Negative electrode
- Positive electrode
- Galvanic cells
- Electrolytic cells



WORKING PRINCIPLES OF METAL AIR BATTERIES

- Mostly primary batteries.
- Oxygen reduced in the cathode, while metal oxidized in the anode.
- Oxygen obtained directly from the atmospheric air.
- No need to storage one of the reactants in the body of the battery.

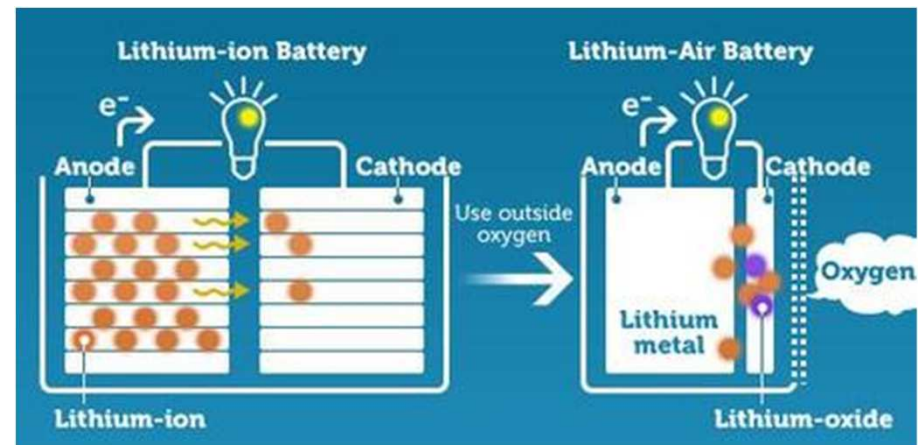


COMPARISON BETWEEN LITHIUM BATTERIES AND METAL-AIR BATTERIES

-Metal-Air batteries can be smaller than Lithium batteries

-Air batteries have a higher charge density

- Tesla has patented a combination of both

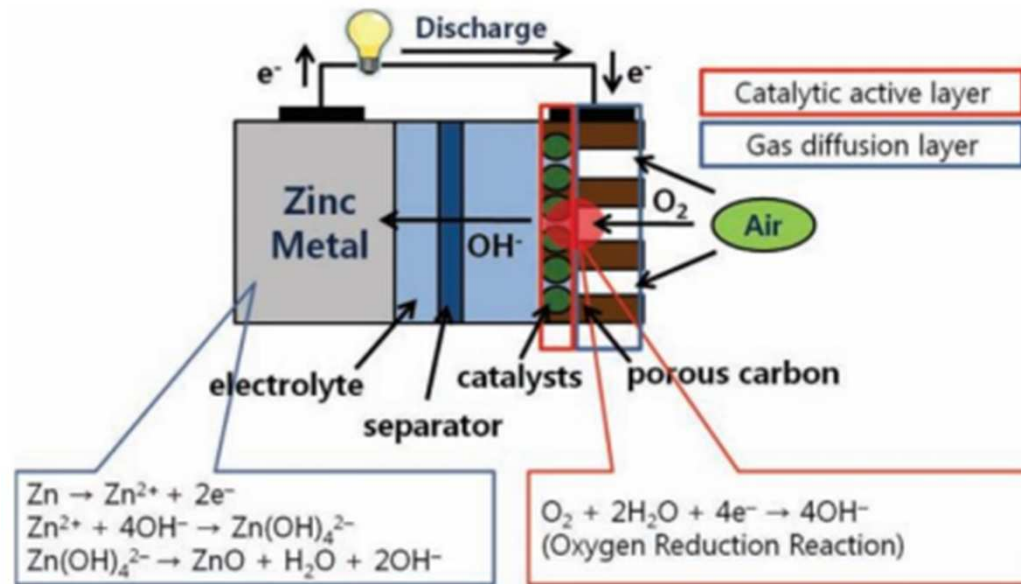


TYPES OF METAL AIR BATTERIES: Zn-AIR

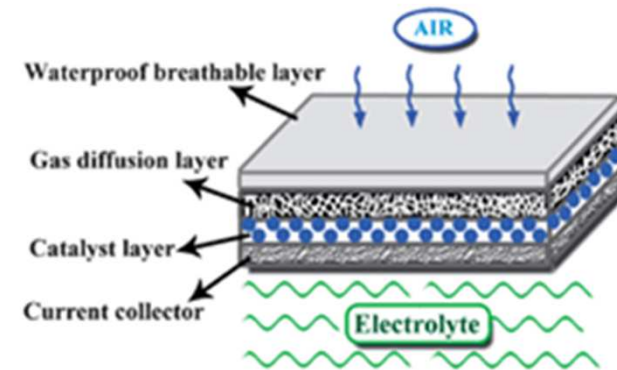
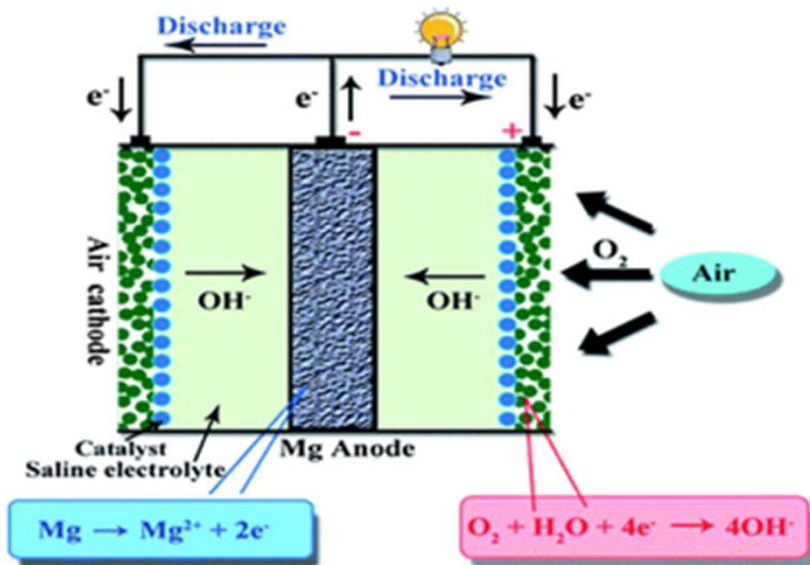
-They can not be electrically charged

-Composed of a zinc anode, air cathode and a separator

-They have an excellent useful life



TYPES OF METAL-AIR BATTERIES: MG-AIR

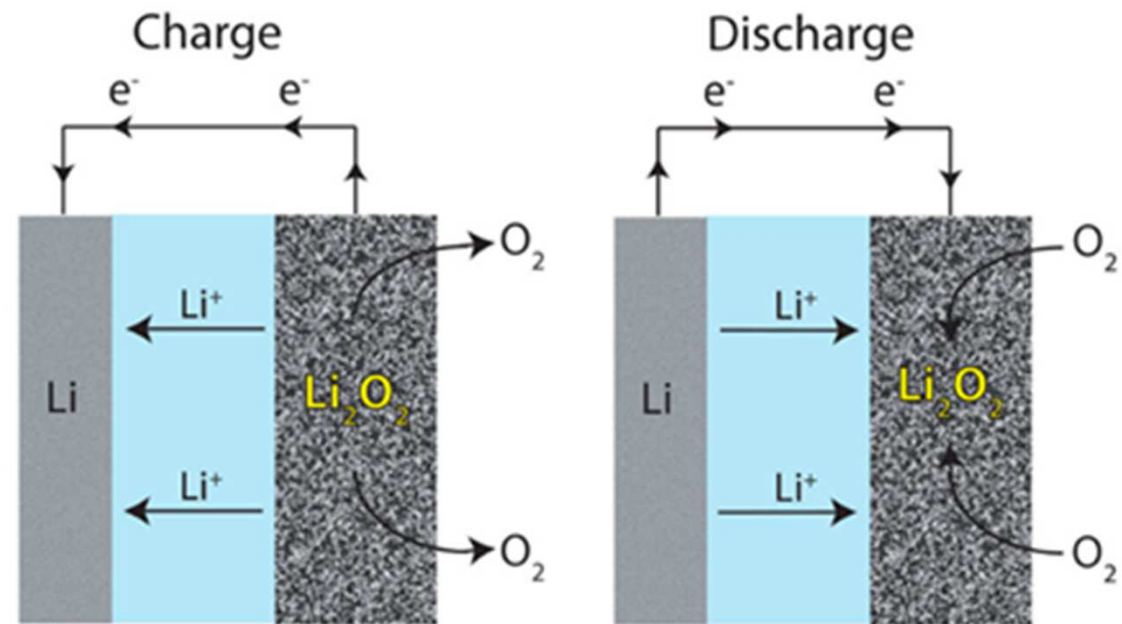


TYPES OF METAL-AIR BATTERIES: LI-AIR

-Produces lithium superoxide

-When it is recharged, the reaction is inverted

-Lithium and oxygen are very reactive

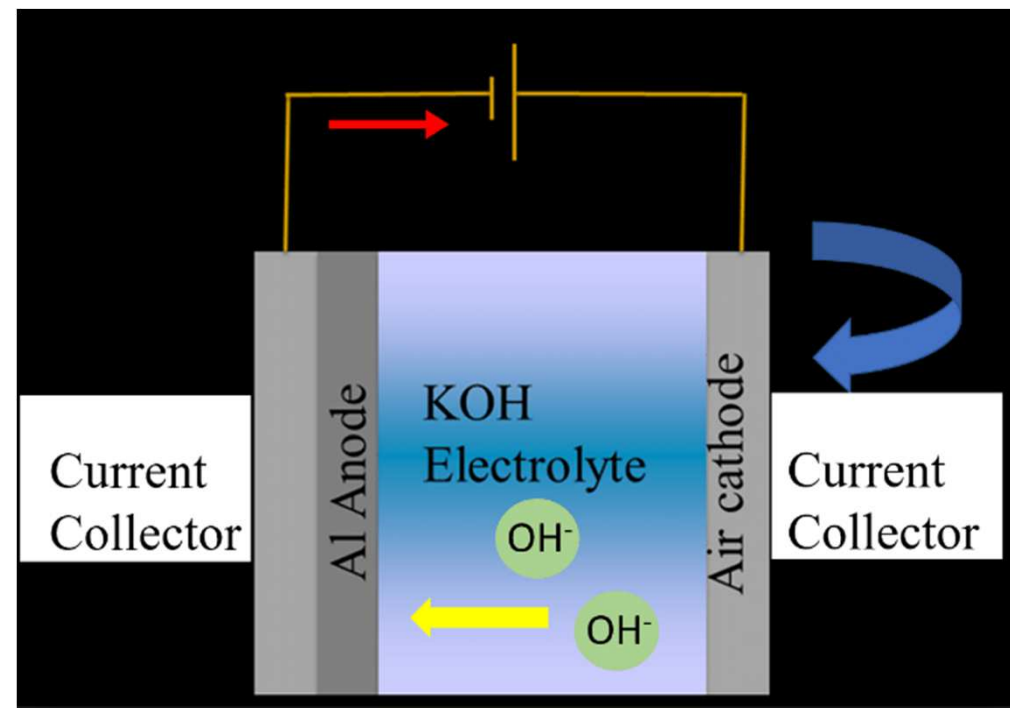


TYPES OF METAL-AIR BATTERIES: AL-AIR

-Aluminium anode, air cathode and aqueous electrolyte

-They have a charge density 8 times higher than lithium batteries

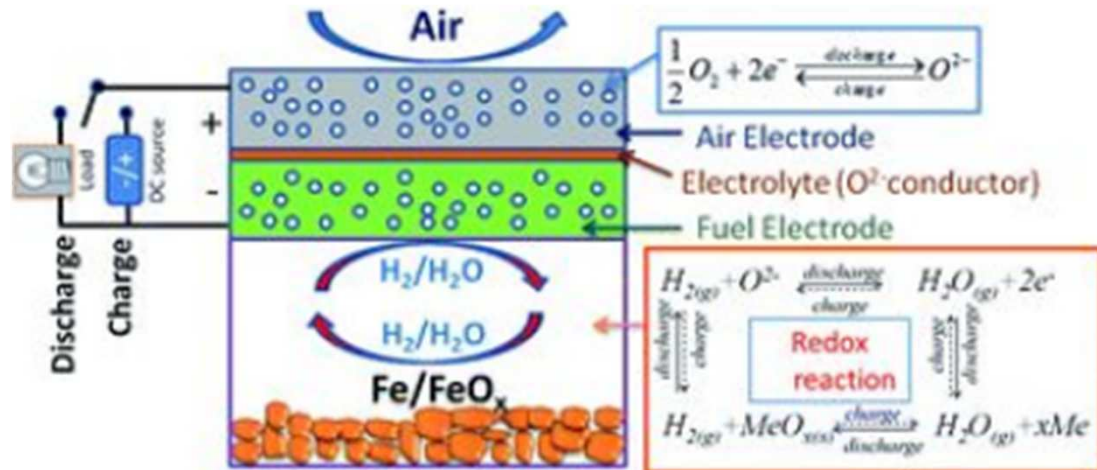
-ALPHA batteries can be recharged by adding salt water



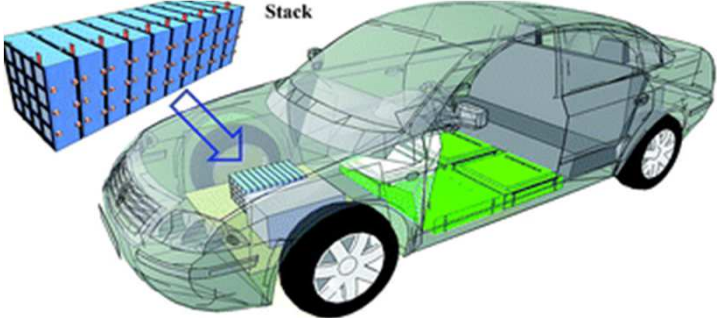
TYPES OF METAL-AIR BATTERIES: IRON-AIR

-They are cheaper than other batteries due to the low cost of iron

-Can provide a great autonomy for cars, although they are still in development



APPLICATIONS



Metal-air Battery || Cathode + **ORRC** + Anode



CONCLUSIONS

-Nowadays, they are still in development, so despite the fact they have a huge specific energy compared to the other batteries, the only that have arrive to the market are zinc-air ones.

