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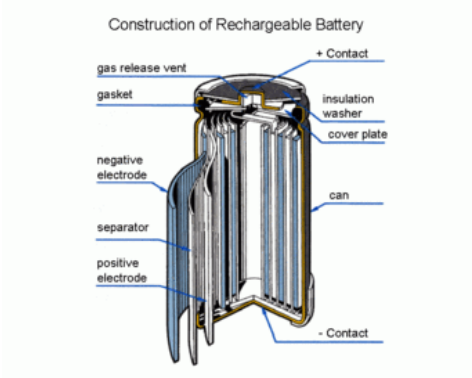
Basic Construction of a Ni-MH Battery

To understand the modifications done to the eneloop batteries, a basic understanding of the construction of a typical Ni-MH battery is necessary.

Basically Ni-MH batteries, like most other rechargeable batteries consist of two metal stripes, the positive and negative electrode. Between these metal stripes an insulating foil, the separator, is placed.
This sandwich of three layers is rolled-up to a coil and placed into a metal can, which acts as negative pole of the battery. Before closing the can with a cap, a liquid, the electrolyte, is filled into the can. The cap contains a gas release vent, which allows to release hydrogen, when the battery is overcharged.

The electrical behaviour of the battery is the result of the dimensions and composition the electrodes and the separator and the composition of the electrolyte.



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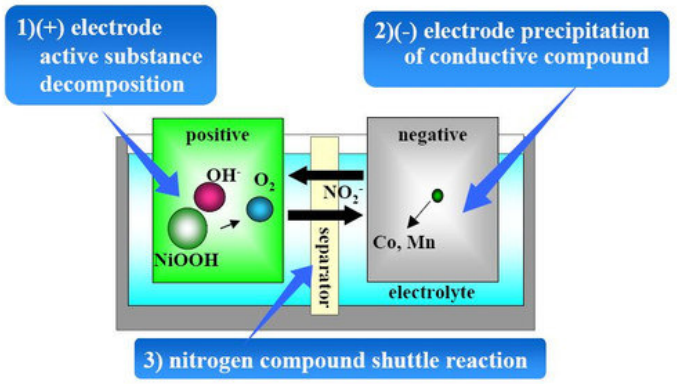
Self Discharge



How was the self-discharge reduced?

Modern Ni-MH batteries consist of two metal stripes (anode and cathode), which are separated by a non-conductive porous plastic foil (separator). These three stripes are laid on top of each other and are wound to a coil. This coil is put in a metal can and immersed with a liquid (electrolyte). Then the metal can is closed with a cap.

The self discharge of Ni-MH batteries is caused by three main reasons:

- the chemical decomposition of the cathode,
- the natural disaggregation of the anode,
- Impurities of the anode.

Now, how could the self-discharge in the eneloop been reduced?

The chemical decomposition of the kathode has been reduced substantially by the use of a new superlattice alloy. As an additional benefit the superlattice alloy increases the electrical capacity of the battery and reduces the internal resistance, which allows higher discharge currents.
Another advantage of the reduced decomposition of this alloy is the fact, that less Cobalt is needed to stabilize the alloy.
The anode has been strengthened by another new material, which reduces the natural disaggregation.
Additionally the separator and the used electrolyte have been optimised for low self discharge of the eneloop.

A detailled description of the technology can be found in this article.

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