

Zinc/Silver Oxide Batteries

The zinc/silver oxide batteries (first practical zinc/silver oxide battery was developed in the 1930's by André; Volta built the original zinc/silver plate voltaic pile in 1800) are important as they have a very high energy density, and can deliver current at a very high rate, with constant voltage. However the materials are high cost, so it is limited to application in button cells, for use in calculators, watches hearing aids and other such applications that require small batteries and long service life.

Characteristics in brief

Voltage: around 1.6 V, linearly dependent on temperature.

Discharge characteristics: Very good – flat discharge curve.

Service life: several thousand hours (continuous use).

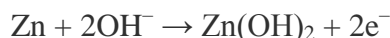
Shelf life: several years (at room temperature).

Chemistry

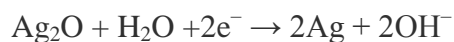
The silver oxide used is usually in the monovalent form (Ag_2O), as it is the most stable.

The following reactions take place inside the cell:

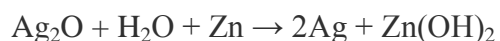
At the anode:



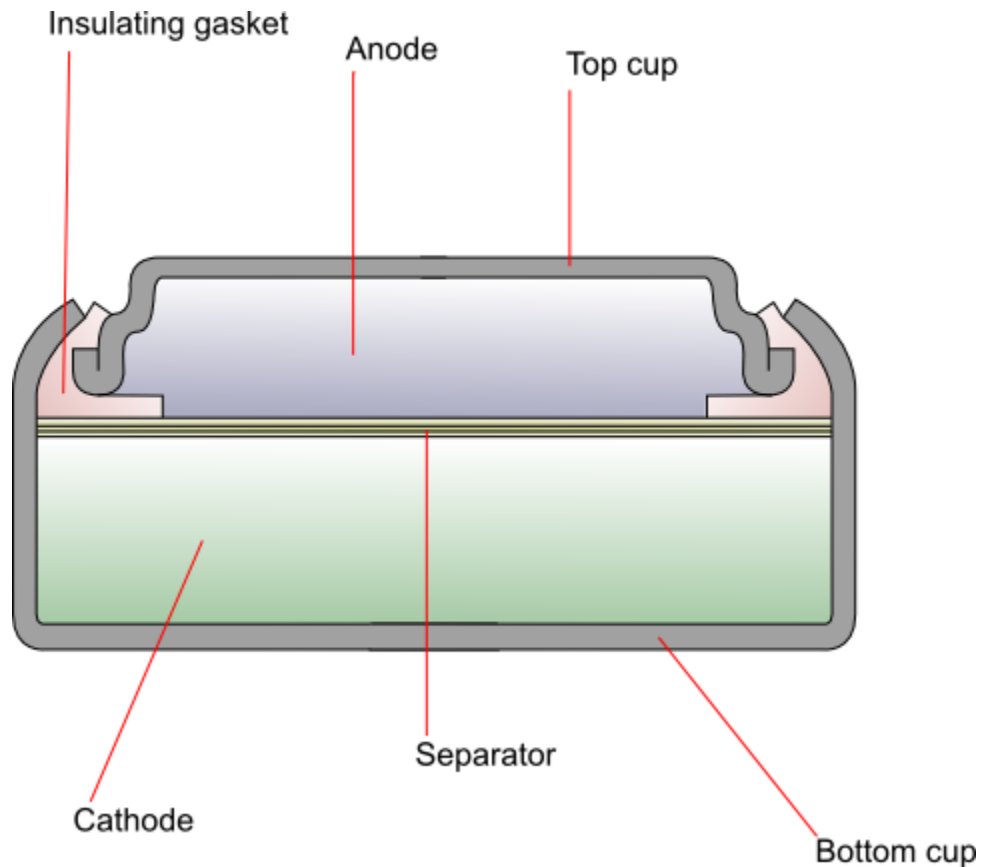
At the cathode:



Overall:



Construction



The cathode is generally composed of monovalent silver oxide with added graphite to improve conductivity. The anode is zinc powder mixed with a gelling agent, which is then dissolved in the alkaline electrolyte. The two are separated by a combination of layers of grafted plastic membrane, treated cellophane and non-woven absorbent fibres. The top cup (negative terminal) is made up of laminated layers of copper, tin, steel and nickel, and the bottom cup (positive terminal) is nickel-plated steel. An insulating gasket prevents contact between the two.

Source: http://www.doitpoms.ac.uk/tlplib/batteries/batteries_zn_ag.php