

ELECTROCHEMISTRY

Electrochemical Cells

In our day to day lives we use different appliances powered by domestic electricity and as well as appliances operated by electrochemical cells.

E.g. Toy Cars, Laptops Mobile Phones

An Electrochemical cell produces electricity by means of chemical reactions.

Many oxidation-reduction reactions occur spontaneously, giving off energy. An example involves the spontaneous reaction that occurs when zinc metal is placed in a solution of copper ions as described by the net ionic equation shown below.



The zinc metal slowly "dissolves" as its oxidation produces zinc ions which enter into solution. At the same time, the copper ions gain electrons and are converted into copper atoms which coat the zinc metal or sediments to the bottom of the container. The energy produced in this reaction is quickly dissipated as heat, but it can be made to do useful work by a device called, an **electrochemical cell**. This is done in the following way.

An electrochemical cell is composed to two compartments or **half-cells**, each composed of an electrode dipped in a solution of electrolyte. These half-cells are designed to contain the oxidation half-reaction and reduction half-reaction separately as shown below.

An **electrochemical cell** is a device capable of either generating electrical energy from chemical reactions or facilitating chemical reactions through the introduction of electrical energy. A common example of an **electrochemical cell** is a standard 1.5 - volt **cell** meant for consumer use.

