Lead-acid battery charging and discharging reaction process

What happens when a lead acid battery is fully discharged?

In between the fully discharged and charged states,a lead acid battery will experience a gradual reduction in the voltage. Voltage level is commonly used to indicate a battery's state of charge. The dependence of the battery on the battery state of charge is shown in the figure below.

How to charge a lead acid battery?

Normally battery manufacturer provides the proper method of charging the specific lead-acid batteries. Constant current charging is not typically used in Lead Acid Battery charging. Most common charging method used in lead acid battery is constant voltage charging methodwhich is an effective process in terms of charging time.

How does a lead acid battery work?

During the cell charging the lead sulfate is converted back into lead peroxide, lead, and sulfuric acid. The average terminal voltage of the lead-acid battery is approximately 2.2V. The working principle of the lead acid cell can be explained with the help of a simple experiment.

What happens when a lead-acid battery is charged in the reverse direction?

As a lead-acid battery is charged in the reverse direction,the action described in the discharge is reversed. The lead sulphate (PbSO 4) is driven out and back into the electrolyte (H 2 SO 4). The return of acid to the electrolyte will reduce the sulphate in the plates and increase the specific gravity.

How a lead-acid battery can be recharged?

Chemical energy is converted into electrical energy which is delivered to load. The lead-acid battery can be recharged when it is fully discharged. For recharging,positive terminal of DC source is connected to positive terminal of the battery (anode) and negative terminal of DC source is connected to the negative terminal (cathode) of the battery.

What happens if a lead acid cell is charged in the opposite direction?

Now to charge the Lead acid cell current in the opposite direction is applied,this way the chemical reaction is reversedand once again the +ve plate becomes Lead peroxide and the negative plate become pure lead,during the same process the electrolyte is also restored i.e electrolyte becomes sulfuric acid.

The charging and discharging of lead-acid batteries need daily maintenance, pay attention to the charger specifications, charging environment, charging voltage when charging, and avoid deep discharge when discharging, so that the lead-acid batteries can be used for a longer period of time.

Charging of lead acid battery: A new or discharged lead acid battery is charged using a DC charger, the

voltage supplied is greater than the battery voltage. The charging process continues until the battery is fully charged. The current will flow through the battery in the reverse direction to when it is supplying current and the battery will ...

Figure 3: Charging of Lead Acid Battery. As we have already explained, when the cell is completely discharged, the anode and cathode both transform into PbSO 4 (which is whitish in colour). During the charging ...

During charging or discharging a lead acid battery both the positive and negative electrodes will undergo reduction and oxidation the same time. For instance during discharging process, the cathode will react with the sulfuric acid and will give the electrolyte electrons i.e. oxidation. And simultaneously the cathode will gain electrons from ...

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Voltage of lead acid battery upon charging. The charging reaction converts the lead sulfate at the negative electrode to lead. At the positive terminal the reaction converts the lead to lead oxide. As a by-product of this reaction, hydrogen is evolved.

This means at the time of the charging process; the lead cathode element stays as lead itself whereas the lead anode is formed as lead peroxide which is dark brown in color. When there is no DC supply and then at the time when a voltmeter is connected in between the electrodes, it displays the potential difference between electrodes.

In this article we will discuss about:- 1. Methods of Charging Lead Acid Battery 2. Types of Charging Lead Acid Battery 3. Precautions during Charging 4. Charging and Discharging Curves 5. Charging Indications. Methods of Charging Lead Acid Battery: Direct current is essential, and this may be obtained in some cases direct from the supply mains. In case the available source ...

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