Electrolysis must be immersed in an ionized

Business, Industries

Electrolysis is an electrochemical process in which a direct electric current passes through a dissolved or molten ionic substance that is in an appropriate solvent and it produces chemical reactions at the electrodes and separation of materials. Electrolysis requires an electrolyte (a substance which when dissolved in a polar solvent produces an electrically conducting solution), a direct current (electric current flowing steadily in one direction) and two electrodes (conductor that is used to make contact with a nonmetallic part of a circuit) to occur.

Put simply, the goal of electrolysis is to split up a chemical solution by using electricity. Electrolysis is essentially the interchange of ions and atoms by adding or removing electrons from the external circuit. The pair of electrodes must be immersed in an ionized solution, the electrolyte, and an electrical potential must be applied across them. The electrodes will attract opposite-charge ions so the cathode will attract cations and the anode will attract anions. Next, the electrons either get released or absorbed.

Any neutral atoms will gain or lose electrons and turn into charged ions that pass into the electrolyte. The ions form uncharged atoms through discharging. Any positive metals will deposit in a layer onto the cathode, a term for this process is ‘ electroplating’. Often the physical state of the products of electrolysis are different from that of the electrolyte. For instance, in the electrolysis of brine, the products, hydrogen and chlorine, are gaseous. Electrolysis is used in industry for refining metals, producing chemicals, electroplating, extracting and purifying metals.

Electroplating is used to coat metal objects with another metal to make them look nicer or more resistant to corrosion. Often, chromium is used to plate car parts so that they are resistant to corrosion. An example of the refinement of metal is the electrolysis of aluminum ore, bauxite, which produces aluminum. Aluminum is used in aluminum foil, cans, kitchen utensils, window frames and all kinds of products. Electroplating is simply the use of electricity to coat a metal with another metal. Electroplating can be used to make cheap metals look expensive by coating mundane metals like copper with metals like gold or silver. This process can also used to make objects resistant to rust, to make plastic look like metal and to produce important alloys like brass and bronze.

The metal atoms that plate an object in electroplating come from the electrolyte. Any electrodes must be completely clean or else they will form a weak bond with the electrolyte. Commonly, an electrode is cleaned by being placed in an alkaline solution or a very strong acid.

A clean electrode can get the atoms from the plating metal to bond to it strongly. The two electrodes must be from different conducting materials, an electricity supply and an electrolyte. Usually, the electrolyte is a solution of the metal that is being plated and one of the electrodes is made from the same metal. Metals like silver and gold are hard to dissolve so need to be turned into solutions using cyanide-based chemicals.

The electrode that is being plated is often made out of a nonmetal coated with a conducting material like graphite or a metal cheaper than the plating metal. The electrodes must be placed into the solution and connected

through a circuit so that the coating metal becomes the anode and the soon to be coated material becomes the cathode. When the power is turned on the solution will split into ions. The ions of the plating metal will attract to the cathode and the negatively charged ions will attract to the anode and release electrons that move through the battery towards the cathode. After a while the cathode will be plated. It is possible to electroplate organic materials like plastic.

Plastics can be coated with a thin layer of metal, plastics such as phenolic plastics, nylon and polycarbonate can be coated this way. Often parts on cars, electrical fittings, households and plumbing are made of plated plastic. Plastics cannot conduct electricity, so to electroplate a plastic it must be cleaned, etched with acid and cleaned with a catalyst so a coating can stick to the surface of the plastic. The plastic is then immersed in a substance like copper or nickel to gain a thin coat of electrically conductible metal. After this process, the plastic can now be electroplated like a metal.

Electrochemical cells are used to power appliances in our everyday lives. Electrochemical can either use chemicals reactions to generate electricity or use electricity to provide energy for chemical reactions. There are two types of electrochemical cells; electrolytic cells and galvanic cells. Electrolytic cells are often aqueous solution or a molten salt, that are two electrodes that are immersed in a conducting liquid.

Galvanic cells are the opposite of electrolytic cells. In galvanic cells, electrical energy is created through a chemical redox reaction. In everyday life we use electrolytic cells to purify and disinfect water. This is done with

sodium hydroxide, chlorine gas and hydrogen gas. This is important because humans must drink clean water to survive and stay healthy.

Galvanic cells are used in everyday life inside lead stored batteries to power different devices. This is important because the lead storage battery allows devices to be portable.