Electroplating Encyclopedia Article

Electroplating

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Electroplating

Electroplating is the process of coating an electrically conducting surface with a thin layer (seldom more than 0.001 in [0.025 mm] thick) of metal by electrolytic deposition. In electroplating, the object to be plated is made the cathode in an electrolytic bath of salts of the metal to be plated. The **anode** may be an unaffected metal, or, more commonly, the metal to be plated. An electric current is passed through the **solution**, which results in the deposition of a thin metal plating in the desired thickness on the cathode. Traces of organic materials are usually added to the plating solution to give a more adherent coating, though the reasons for this effect are not well understood.

Electroplating may be used to increase the value or improve the appearance of an object. For example, the technique is used to silver-plate table utensils and to weatherproof objects with **cadmium** or **chromium** plating. Coatings such as **zinc** and **tin** provide protection against **corrosion**. Other plated **metals** include **nickel**, **copper**, and **gold**.

While the electroplating is in progress, additional salts of the metal to be plated must continually be added to the plating solution, or else the anode must be renewed, if it consists of the plating metal. If the coating metal does not form a strong **alloy** with the metal to be plated, it may be necessary to first coat with an intermediate metal; for example, when plating **silver** on steel, it is customary to first place a coating of copper over the steel.

When plating gold or silver, it is customary to use a solution containing a double cyanide of the coating metal and **potassium** (the cyanide **ion** lowers the **concentration** of free metal ions, and prevents the plating from taking place too rapidly). In nickel plating, an electrolytic solution containing nickel ammonium **sulfate** may be used.