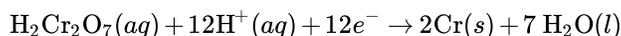


17.6: Electroplating

An important industrial application of electrolysis is the plating of one metal on top of another. A typical example is the bumper of a car. This is made from steel and then plated with a thin layer of chromium to make it resistant to rusting and scratching. Many other metal objects, such as pins, screws, watchbands, and doorknobs, are made of one metal with another plated on the surface.

An electroplating cell works in much the same way as the cell used to [purify copper](#). The object to be plated is used as the cathode, and the electrolyte contains some ionic compound of the metal to be plated. As current flows, this compound is reduced to the metal and deposits on the surface of the cathode. In chromium plating, for instance, the electrolyte is usually a solution of potassium dichromate, $\text{K}_2\text{Cr}_2\text{O}_7$, in fairly concentrated sulfuric acid. In this very acidic solution CrO_7^{2-} ions are completely protonated, and so the reduction half-equation is



Other metals which are often electroplated are silver, nickel, tin, and zinc.

In the case of silver the electrolyte must contain the polyatomic ion $\text{Ag}(\text{CN})_2^-$ rather than Ag^+ . Otherwise the solid silver will be deposited as jagged crystals instead of a shiny uniform layer.

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