

IN DEPTH



One of the most common chemical reactions is called oxidation. It occurs when certain metals undergo chemical reactions with oxygen. Since oxygen is readily available both in the air and as a component of water, it's often difficult to prevent metals from undergoing this reaction!

One of the most common forms of oxidation is rust, which forms on iron. Due to the arrangement of electrons in iron atoms, iron is an **anode**—that is, it gives up electrons easily. When iron comes into contact with water, electrons flow away from the iron's surface, into the water, dissolving the iron.

As this happens, the water, too, begins to break down into its elements, hydrogen and oxygen. Oxygen is an element that accepts electrons easily, so it bonds with the dissolved iron, creating a new compound called **iron oxide**, a.k.a. rust. As electrons continue to flow away from the iron, more and more of it dissolves, and more and more rust forms.

If you've got any silver jewelry, you may have noticed it turning brown or black over time. That's called **tarnishing**, and it's a form of oxidation, too. Fortunately, silver tarnishing can be reversed by rubbing the silver with a special cream or a silver polishing cloth!

The green coating that forms on copper (think of old pennies or the Statue of Liberty) is also the product of oxidation. **Copper oxide** is created when oxygen bonds with copper molecules. And its green color is a result of the chemical properties of copper, just like the reddish-brown color of rust is a result of the chemical properties of iron.