

# Metalworking

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This copper leaf (below) is coated in a chemical patina, which speeds up a natural oxidation process and makes the copper look green. When copper oxidizes naturally, copper salts are also formed, and those salts create the green patina. An example of natural copper oxidation is the statue of liberty (bottom). It has been exposed to the elements so long that the entire surface area has oxidized and turned green.



At the molecular level, oxidation occurs because the copper atoms are losing electrons when other atoms, like oxygen atoms, bond with them, forming salts.



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Niobium can also be oxidized to create art. The metal can be anodized in electrolyte solution at different voltages. At each different voltage a different thickness of oxidation forms and each different thickness appears to be a different color (below).

Oxidation can sometimes be a hassle, especially when your bike chain rusts. But it can also be a useful tool for artists. The statue of liberty is a monument to patriotism and freedom, and it is an iconic image of America, which would not be the same if it was any other color. When I really stop to think about it, I am sure there are countless works of art that would not be nearly as original or unique without having been exposed to time and weather. Oxidation represents timelessness and endurance, which is what every artist strives to create. Although these projects only took a few hours, they helped me to understand the painstaking patience it would take to create something like this and then let it decay to perfection over the course of decades or even centuries.