

Why . . . STAINLESS STEEL DOES NOT RUST

Stainless steel doesn't rust because of the interaction between its alloying elements and the environment, according to *Scientific American* (August 2001). It contains iron, chromium, manganese, silicon, carbon, and in many cases, significant amounts of water and air to produce a very thin, stable film that consists of such corrosion products as metal oxides and hydroxides. Chromium plays a dominant role in reacting with oxygen to form this film.

This stable film prevents additional corrosion by acting as a barrier that limits the access of oxygen and water to the underlying metal surface.

Because the film forms so readily and tightly, just a few atomic layers of the material reduce the rate of corrosion to very low levels. The film is much thinner than the wavelength of visible light, and so it is difficult to see without the aid of modern instruments. Thus, although the steel is in fact corroded at the atomic level, it appears stainless to the unaided eye.

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