

Why do things rust and what rusts the fastest?

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Table of contents

Acknowledgements.....	1
Purpose and hypothesis.....	2
Background research.....	3-5
Materials.....	6-7
Procedure.....	8
Data/Graphs.....	9
Results.....	9
Conclusion.....	10
Works cited.....	11

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Purpose

The purpose of my investigation is to see what material will rust the fastest and why things rust.

Hypothesis

If I test different metals which will rust the fastest? I believe my research will show that iron is the metal that will.

Why do things rust? That's a good question. Things rust when exposed to air. Most metals rust or oxidize at the surface, forming a coat or tarnish of dull metal oxide. When this happens to aluminum or silver the coat keeps the untarnished metal from the air and prevents more corrosion. With iron or steel the rust process happens much faster and has a faster momentum to rusting. (What is rust...,2014)

When rusting happens all of the product has a big part in the cycle. The metal's part is the most important. Without it, there would be nothing for the rust to form on. Air is needed. Rust is not always a brown reddish color. Sometimes it is green. When iron reacts with chlorine in an underwater environment, green rust appears. This can sometimes be seen on steel used in underwater pillars.(Rust facts for kids...,2020)

The first person to discover rust was the great Roman philosopher Pliny. He wrote at a length about ferrum corrumpitur or spoiled iron. They called rust, spoiled iron when they did not have the name rust. Pliny used to think of rust as a punishment from the gods. People thought that rust was a good and bad thing a long time ago. It was thought to be good because people could use it for swords and to help hold up the Alexander The Great Bridge. Warriors thought that rust helped them fight in battles because it added extra padding to their armor. (Rust in history...,1999)

Rust moves from place to place until it takes over the whole piece of metal. Rust spreads by the process of metal corrosion. It is an electrochemical process. An electrochemical process is a reaction, any process either caused or accompanied by the passage of an electric current and involving in most cases the transfer of electrons between two substances. This means, one

substance is a solid and one is a liquid. happens on a molecular level as electrons transfer from iron molecules to the surrounding oxygen molecules, changing the makeup of the iron and turning it into rust. This is happening to iron all the time. You will always find a little bit of rust on everything. (Rust911...,2020)

Steel is normally protected by rust from a process called galvanization. Galvanization means that steel will be coated with a layer of zinc. Use zinc to coat steel and not any other chemical because zinc will prevent rust from mixing with water molecules. If one tiny part of the zinc molecule comes off or is chipped, the steel can then become valuable to rust. (oxegen book,...)

There are different types of ways to get rid of rust. There are some products in stores or one can make a homemade product. Some good ones to use to get rid of rust are sanding the rust with sandpaper and wearing protective gloves for safety. People can also use an abrasive wheel. An abrasive wheel is a metal that can be used to scrape or cut tools. What liquid can make rust form the fastest? The most common liquid that can make rust form is water. Water is the most common because when it rains, everything outside is vulnerable. Vinegar can speed up the process of rusting. This is because it contains a dilute form of acetic acid, which makes rust go by faster by using its positive hydrogen ions that remove electrons from iron, ionising it and making it receptive to rust. (bob villa,..... Andréana Lefton.... 2020)

Does salt water also make rust form? Salt water does not make a metal rust, but it makes the rusting process occur a little faster, because electrons move more easily in salt water than

they do in pure water. This shows that salt water does not make things rust but it can speed up the rusting process. (Gillespie, 2018)

What is lawn rusting? Lawn rusting is rust that grows on your lawn or grass. It is a little bit like rust that would be on metal or steel. It is different because the lawn rust can come off the grass with your fingers sliding on sides of the grass. A way to identify this type of rusting is by pulling out a piece of grass out of the ground and then look very close and if there is yellow or reddish brown dust then there is lawn rusting. (Grant, 2020)

What are good products to get rid of rust? The best product to get rid of rust on metal is Rust Cutter. This product has been proven to get rid of rust on metal very efficiently and very well. The best product to get rid of rust for household items is Iron OUT Powder Rust Stain Remover. (The Best Rust ..., 2020)

Materials

- ❖ Bobby pins
- ❖ Soda can
- ❖ Scissors
- ❖ Penny
- ❖ Nickel
- ❖ Nail
- ❖ Metal spoon
- ❖ Metal cylinder
- ❖ Tin foil
- ❖ Tin plate
- ❖ 16oz of hydrogen peroxide
- ❖ 2oz of white vinegar
- ❖ Half tablespoon of salt
- ❖ Screws
- ❖ Large container w/ lid
- ❖ Spray bottle
- ❖ Warm water
- ❖ Gloves
- ❖ Goggles

- ❖ Glue sticks
- ❖ Thermometer
- ❖ Ointment
- ❖ First Aid kit
- ❖ Paper Towels
- ❖ Labels
- ❖ Clearcups
- ❖ Folding board

Procedure

- First I will combine 16 oz of hydrogen peroxide with 2oz of white vinegar and a half tablespoon of salt
- I will put the mixture into the spray bottle and spray down the bobby pins, screws, foil, tin plates, nail, scissors, binder clip, soda can, penny, nickel, metal halo cylinder, and the metal spoon
- Then I will measure how long it takes to rust. I will let it stand for 14 days
- I will do this 3 times
- At the conclusion, I will compare the research and complete a graph showing the measurements
- This will complete my research.

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