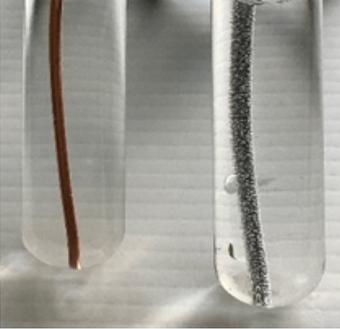


4.4 Reaction of noble and base metals with acids

<p>Basic information and collecting ideas</p> 	<p>In everyday life and in technology, metals often come into contact with acids. The following experiments area designed to show which metals are particularly sensitive to acids and how the metals can be protected.</p> <p>Metals are often seen as a tough material. But when base metals such as zinc and iron come into contact with acids, the metals are literally “eaten away”: The acids react with the metal to form a water-soluble salt and hydrogen, which weakens the stability of the materials.</p> <p>In tanks filled with dangerous substances, resulting holes can be very dangerous for the environment. Noble metals can be recognized by the fact that they do not react with acids.</p> <p>But acids are also good cleansing agents for metals. Acids are used to remove an existing metal oxide layer on the surface of a metal so that the metal can be further processed.</p> <p>In the “money laundering” experiment with copper coins, copper oxide is removed by acids such as citric acid and the copper’s surface becomes shiny again.</p>								
<p>Setting up and conducting experiments</p> 	<p>1. – 3.: Zinc and iron will react with the acid to form small hydrogen bubbles (base metals). Copper will not react with acid (seminoble metal).</p> <p>4.: Copper coins go through many hands. Dark copper oxide forms on the surface. This oxide can react with acid to form salt and water, making the metal surface shiny again (see picture below).</p> <div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;">Coins in an acidic solution</p>								
<p>Observing and documenting</p> 	<ul style="list-style-type: none"> ▪ The students should realize the differences between noble and base metals. ▪ They should be able to name some noble metals (platinum, gold, silver, etc.) and base metals (zinc, iron, aluminium, lead, etc.) ▪ Word equations: <table style="margin-left: 20px; border: none;"> <tbody> <tr> <td>Metal</td> <td>+ acid react to form</td> <td>→</td> <td>salt + hydrogen</td> </tr> <tr> <td>Metal oxide</td> <td>+ acid react to form</td> <td>→</td> <td>salt + water</td> </tr> </tbody> </table> 	Metal	+ acid react to form	→	salt + hydrogen	Metal oxide	+ acid react to form	→	salt + water
Metal	+ acid react to form	→	salt + hydrogen						
Metal oxide	+ acid react to form	→	salt + water						

