

4.5 Alloys

<p>Basic information and collecting ideas</p> 	<p>Method “think-pair-share”: You’ve heard about “steel”. How can you explain that there are about 1,200 different types of steel?</p> <p>You’ve probably heard of alloys like brass, bronze, steel, or rose gold. Alloys are solid mixtures of different metals to improve their properties (e.g. the hardness of iron by the addition of chromium, rose gold by the addition of copper).</p> <p>In the following experiment, we want to show how we make the alloy brass from copper and zinc. Musical instruments (e.g. saxophone) are produced from brass.</p>	
<p>Setting up and conducting experiments</p> 	<p>Set up:</p> <ul style="list-style-type: none"> ▪ copper ring/wire/coin ▪ glass beaker ▪ sodium hydroxide ▪ zinc powder ▪ gas burner ▪ crucible tongs <p><i>The teacher will do experiment steps 1.-3. The students do step 4.</i></p> <p>Work only under supervision by your teacher and wear protective goggles:</p> <ol style="list-style-type: none"> 1. Dissolve 2 g of NaOH in 20 ml of water in a glass beaker and add two spoons of zinc powder to the solution 2. Clean a copper coin with citric acid and use tweezers to place it in the solution. Heat the solution on a stand above a tea light for about 5 minutes. 3. Using the tweezers/spoon, remove the copper coin when it shows a grey layer of zinc and rinse it in water. 4. Using the tweezers, briefly pass the copper coin through the blue flame of a gas burner several times until the copper coin looks golden. <p>Cool the coin in water before you touch it with your fingers!</p>	 <p>sodium hydroxide – corrosive</p>
<p>Observing and documenting</p> 	<p>The students should recognize the colour change from grey to yellow-red:</p> <p>The flame melts thin layers of zinc and copper and they mix to form a solid “solution” of zinc and copper (alloy: brass).</p>	
<p>Analysing and reflecting</p> 	<ul style="list-style-type: none"> ▪ What metals would you mix to produce a solder for low or high melting temperatures? <i>> Low-melting solder: Metals with low melting points (lead, bismuth) High-melting solder: Metals with high melting points (copper, silver)</i> 	

