

Before: Predict what happens when certain metals are dropped into water



SCIENCE

3 C - During: clarify the term electrons

4 C - During: clarify the term precedes

Why metals have a blast in water

High-speed cameras now show why some metals explode when they get wet

It's a classic chemistry experiment: A begoggled teacher drops a bit of metal into water — and KABOOM! The mixture explodes in a bright flash. Millions of students have seen the reaction. Now, thanks to images captured with a high-speed camera, chemists can finally explain it.

The experiment only works with elements that are alkali metals. This group includes sodium and potassium. These elements show up in the first column of the periodic table. In nature, these common metals occur only in combination with other elements. And that's because on their own, they're very reactive. So they easily undergo reactions with other materials. And those reactions may be violent.

Textbooks typically explain the metal-water reaction in simple terms: When water hits the metal, the metal releases electrons. These negatively charged particles generate heat as they leave the metal. Along the way, they also break apart the water molecules. That reaction releases atoms of hydrogen, a particularly explosive element. When the hydrogen meets the heat — ka-POW!

But that's not the whole story, cautions chemist Pavel Jungwirth, who led the new study: "There's a crucial piece of the puzzle that precedes the explosion." Jungwirth works at the Academy of Sciences of the Czech Republic in Prague. To find that missing puzzle piece, he turned to videos of these high-speed events. His team slowed down the videos and examined the action, frame by frame.

In the fraction of a second before the explosion, spikes appear to grow from the smooth surface of the metal. These spikes launch a chain reaction that leads to the blast. Their discovery helped Jungwirth and his team understand how such a big blast could erupt from such a simple reaction.

1 Q - During: What are two examples of alkali metals?

2 Q- During: How do textbooks describe the reaction?

5 Q- During: What did they discover happens when the metal hits the water?

6 After: Why do metals have a blast in water? **Summarise** your findings.
