



Safety Corner

An Accident Involving Ignition of Hydrogen Soap Bubbles



The accident occurred when the teacher was demonstrating an experiment on testing hydrogen gas. The purpose of the experiment was to ignite the hydrogen gas trapped in the soap bubbles to produce the “pop” sound, a typical property of hydrogen gas.

Following the procedures of the experiment, the teacher tried to prepare some soap bubbles on the bench mat from hydrogen gas generated from a reaction flask containing some zinc granules and dilute hydrochloric acid. The teacher failed to make the soap bubbles after a few attempts. Aiming at producing the desired outcome, she then decided to light up a splint first and tried to ignite the soap bubbles once they were formed. Unfortunately, the burning splint was placed too close to the set-up. The flammable hydrogen gas inside the set-up was ignited and gave rise to an explosion. During the demonstration, the students were either sitting or standing in front of the teacher's bench. The teacher, the laboratory technician and a total of ten students were reported to be injured in the accident. They were promptly sent to the nearby hospital for examination and medical treatment. The teacher, the laboratory technician and 3 other students were found to have suffered from very minor cut by broken glass. Only one student required stitching on the back of her right palm resulting from a more serious cut.

Hydrogen is highly flammable and it readily forms explosive mixtures with air (mixtures between 4% and 74% by volume of hydrogen are explosive). Science teachers must therefore take adequate safety precautions when carrying out teacher demonstration or organizing student experiments involving hydrogen. For example, teachers or students should use test tubes instead of gas jars to perform the ‘pop’ sound test for hydrogen. The injury of the accident could have been minimized if proper safety measures, like the use of safety screen and safety spectacles, had been taken. The experiment was included in the teaching plan for the first time.

In order to avoid similar laboratory accidents happening in the future, science teachers are requested to note the following:

1. Any newly conducted experiments or potentially dangerous experiments should be tried out before they are performed to avoid any unpredictable mishaps.
2. Teachers and students should wear safety spectacles when conducting potentially dangerous experiments. A safety screen should also be used if teachers demonstrate such experiments.
3. In the above-mentioned teacher demonstration, the set-up generating the hydrogen gas should be completely removed from the laboratory bench and placed in the fume cupboard before the hydrogen soap bubbles are to be ignited.
4. The experiment can be replaced by safer alternatives such as the microscale experiment.