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[Home](#) > Lightning in a test tube

Lightning in a test tube

Posted by Anonymous on Thu, 2015-08-20 15:08

Lightning in a test tube: I have a teacher who is planning on performing the 'lightning in a test tube' demonstration in the school lecture theatre. The experiment involves layering ethanol on top of sulfuric acid in a test tube and then dropping some potassium permanganate crystals into the sulfuric acid. I would prefer it to be performed in a fume cupboard.

Voting:



No votes yet

Year Level:

7

8

9

10

Senior Secondary

Laboratory Technicians:

Laboratory Technicians

Showing 1-1 of 1 Responses

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Submitted by sat on 25 August 2015

Answer reviewed 23 February 2023

Science ASSIST strongly advises against this demonstration being performed in a school. The risks are too high and the demonstration is not able to be adequately controlled.

Each of the chemicals involved in this activity has its own particular significant hazards.

- Ethanol: flammable liquid
- Sulfuric acid: corrosive acid
- Potassium permanganate: oxidising agent

Sulfuric acid reacts with potassium permanganate to form manganese (VII) oxide (Mn_2O_7) [also called manganese heptoxide], which is explosive and reacts violently with the ethanol. Significant risks of explosion or fires or both are foreseeable and cannot be controlled, so the risk assessment would conclude that **the risks of the demonstration are significant and cannot be adequately controlled and therefore should not be conducted.**

Alternative demonstration

An alternative method for demonstrating this reaction in a **controlled** way on a **small scale** can be found on the Royal Society of Chemistry Education in Chemistry website: '[Balls of fire](#)'.¹

Planning science activities

A risk assessment should be conducted for each practical activity, taking into consideration aspects including staff training, student skills and behaviour, staff/student allergies, school facilities and whether it is permitted in your jurisdiction.

The Queensland Department of Education has produced a safety alert on the topic of unpredictable experiments: see <https://education.qld.gov.au/> and search for 'Unpredictable science experiments'² and guidance material for planning science experiments, investigations and activities.³

References

1 Royal Society of Chemistry (2014) '[Balls of fire](#)'. Retrieved from the Royal Society of Chemistry Education in Chemistry website: <https://edu.rsc.org/exhibition-chemistry/balls-of-fire/2000040.article>

2 Queensland Department of Education, (2014) *Safety Alert: Unpredictable experiments*. Retrieved from the Queensland Department of Education website: <https://education.qld.gov.au/> and search for 'Unpredictable science experiments'.

3 Queensland Department of Education, (2021, October 28). *Science experiments, investigations and activities*. Retrieved from the Queensland Department of Education website: <https://education.qld.gov.au/curriculum/stages-of-schooling/CARA/activit...>

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