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Phosphorus use and storage

Posted by Anonymous on Mon, 2015-08-24 12:25

Demonstration of phosphorus: Are teachers still allowed to demonstrate the properties of white phosphorus? If so, where do we get some? Clearly we would need only a tiny amount.

is it desirable or necessary to store Phosphorus in a sand bath? (Yes, I know it goes under water first!)

Voting:



No votes yet

Year Level:

10

Senior Secondary

Laboratory Technicians:

Laboratory Technicians

Showing 1-1 of 1 Responses

Demo of phosphorus

Submitted by sat on 25 August 2015

Answer reviewed 27 February 2023

White Phosphorus^{1, 2, 3, 4}

Phosphorus is not on our [List of recommended chemicals for science in Australian schools 2021](#)⁵ because of the significant risks associated with its storage and use which include the following:

- **Fire hazard:** White phosphorus is a severe fire hazard and will ignite on exposure to air. It is classified as DG 4.2 and packing group I, which represents 'high danger'. It is a pyrophoric solid, spontaneously combustible in air, which is why it should be stored under water at all times.
- **Toxic hazard:** Upon combustion in air both red and white phosphorus produce highly toxic phosphorus pentoxide. In water with low oxygen content may produce phosphine. Therefore, inhaling the fumes should be avoided at all times.
- **Security hazard:** Phosphorus is listed as a chemical of security concern and a drug precursor, category 1.^{6, 7}

Science ASSIST strongly recommends the disposal of phosphorus by a licenced chemical disposal contractor. See our list of School science suppliers⁸ for contact details.

Instead, a suitable video could be shown to demonstrate the properties of white phosphorus. For example: <https://youtu.be/LSYLUat03A4>⁹

Recommendations

For schools that may currently have white phosphorus, we recommend that it is disposed of by a licensed waste disposal contractor. Until this is achieved, it is vital that the correct storage is managed by a technician or teacher with tertiary-level chemistry training and/or experience such that they understand the chemistry and hazards involved with storing and handling the chemical.

White Phosphorus:

- should always be stored under water in a clear glass jar (Note: many schools may have traditionally kept the glass jar in a tin in a sand bath)
- In cold locations, ensure that it is stored appropriately to prevent the water from freezing which might cause the jar to break
- Containers should be regularly monitored and the phosphorus should not be allowed to dry out
- Should always be stored in a secure chemical store away from incompatible substances
- Should be handled under water in an operating fume cupboard, with appropriate PPE and established handling safe procedures.

Red phosphorous is more easily managed and less hazardous than white phosphorus.¹⁰ It should be stored with other flammable solids away from oxidising agents, alkalis and other incompatible chemicals.¹⁰

References

1 Sigma Aldrich website, (2020, February 3) '*White phosphorus*', please search the product information on the website for the latest version of the Safety Data Sheet
<https://www.sigmaaldrich.com/AU/en/sds/ALDRICH/302554>

2 CLEAPSS. Phosphorus: (*Hazcard* 73A) <http://science.cleapss.org.uk/Resource-Info/HC073A-Phosphorus-P-white-ye...> (login required)

3 Public Health England website. '*Phosphorus: properties and incident management*' Chemical hazards compendium - GOV.UK (www.gov.uk)

4 Agency for Toxic Substances and Disease Registry website. *Public Health Statement for White Phosphorus* White Phosphorus | Public Health Statement | ATSDR ([cdc.gov](https://www.cdc.gov)) (Accessed February 2023)

5 Science ASSIST website, (2021, March) '*List of recommended chemicals for science in Australian schools*'
<https://assist.asta.edu.au/resource/4669/list-recommended-chemicals-scie...>

6 Chemistry Australia Website, *Code of Practice for Supply Diversion into Illicit Drug Manufacture*, 2008,
https://chemistryaustralia.org.au/safety-environment/code_of_practice_fo...

7 Australian National Security website, *Chemical Security: National Code of Practice*
, 2016, National Code of Practice (nationalsecurity.gov.au)

8 Science ASSIST, 2020, List of *School Science Suppliers*, School science suppliers | ASSIST (asta.edu.au)

9 University of Nottingham, Periodic table of videos (2010, August 22), '*Phosphorus*',
<https://youtu.be/LSYLUat03A4>

10Sigma Aldrich Australia website, (2023), *Safety Data Sheet: Phosphorus, red*. Please search the product information page on the website for the current SDS for Phosphorus Merck | Australia | Life Science Products & Service Solutions (sigmaaldrich.com)

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