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Alkane/Alkene/Bromine Water clean up

Posted by Anonymous on Fri, 2018-02-09 12:24

Alkane/Alkene/Bromine Water clean up: My teachers yesterday did a prac on the reactivity of alkanes and alkenes with bromine water. The waste chemical products have been collected for disposal, however do you have any tips as to how to clean up the residual chemicals from the glassware? Thanks!

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9

10

Senior Secondary

Laboratory Technicians:

Laboratory Technicians

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Submitted by sat on 14 February 2018

Appropriate waste disposal procedures and cleaning of glassware is an important part of safe laboratory work practices.

In the experiment that you describe, bromine water is used to test whether an organic

compound is unsaturated¹; it is used to distinguish between alkanes and alkenes such as cyclohexane and cyclohexene, and hexane and hexene. As bromine water and many of the alkanes and alkenes used for this type of demonstration are hazardous, it is recommended that micro-techniques be used to minimise the amount of chemical waste that is produced.

Safety data sheets for each chemical used and produced should be consulted for advice on hazards, incompatibilities, disposal procedures and correct PPE.

Hazards of the chemicals used

Bromine water (5%v/v) is a highly reactive, toxic and corrosive solution. It is also an aquatic toxin. Exposure of the eyes, skin and respiratory tract may lead to severe irritation and burns^{1,2,3}.

Alkanes and alkenes such as cyclohexane and cyclohexene, are highly flammable in both liquid and vapour phases, cause skin, eye and respiratory tract irritation, may be fatal if swallowed, and are very toxic to aquatic life^{4,5, 6,7}. Some alkanes can cause drowsiness or dizziness.

All of these chemicals should be handled in an operating fume cupboard.

Waste disposal

- No hazardous organic chemical waste solution from this demonstration should be disposed of down the sink.
- The waste chemical products from these reactions should be carefully collected into a labelled halogenated organic waste bottle for collection by a chemical waste contractor. This should be performed in a fume cupboard wearing appropriate Personal Protective Equipment (PPE) such as chemical resistant (nitrile) gloves, laboratory coat and safety glasses. The waste container should be compatible with the disposed chemicals.

As the waste quantities will be small, additional compatible wastes may be added to the waste bottle. It is important to keep track of the substances added to the waste bottle by recording them on the label. The waste bottle should be stored in a flammable liquids cabinet until ready for collection by a chemical waste contractor.

Glassware cleaning procedure

In organic chemistry glassware cleaning is usually a multi-step process.

1. Rinse the glassware with a small amount of organic solvent such as ethanol or methylated spirits. (Simple alkanes and alkenes have low solubility in water.)
2. These rinsings can be added to the same labelled halogenated organic waste bottle in the fume cupboard.
3. Invert the clean glassware onto paper towel in the fume cupboard and leave for several hours or overnight.

Inverting onto paper towel helps to drain the glassware and helps to evaporate any residual solvent in the fume cupboard (larger surface area). You could line an ice cream container with

paper towel, then invert the glassware into it. Leave the fume cupboard operating until all the residual solvent has evaporated.

After the solvent has evaporated, the paper towel is disposed of as general waste.

- that paper towel in an operating fume cupboard needs to be weighed down, otherwise it can get sucked up into the back of the fume cupboard, rendering it non-operational.
- Finally, wash glassware normally in warm, soapy water, then rinse with water and dry.

References and further reading:

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Submitted by nehal.trivediasta on 23 March 2018

Very good question and helpful expert answer. In fact I learnt new way of managing the used glassware from organic chemical. Thanks -- Nehal

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